THE EFFECT OF PRENATAL METHADONE EXPOSURE ON CHILD ADAPTIVE BEHAVIOUR AND ITS ASSOCIATION WITH CAREGIVERS PARENTING AND GENERAL EVERYDAY STRESS

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Abstract

The current study is the first investigation of prenatal methadone exposure on adaptive behaviour in middle-school aged children, and the subsequent relationship with caregiver stress. A cross-sectional design was employed and participants were 27 caregivers of methadone-exposed (ME) children and 26 caregivers of non-exposed (NE) comparison children who completed a Maternal Health Interview and child questionnaires. Results showed that ME children were regarded by their caregivers as having significantly less adaptive behaviour skills overall, as well as poorer scores across the five domains of adaptive behaviour than NE children. Caregivers of ME children reported significantly higher scores on the Sources of Stress scale of general everyday stress than NE caregivers, whilst there were no significant differences between caregivers reports of parenting stress. After controlling for group and socio-economic status (SES) there was no significant relationship between child adaptive behaviour and caregiver general stress. In conclusion, the findings of the current study provide novel information into the research of adaptive behaviour in middle-school aged ME children and their caregivers stress levels. These findings pinpoint the need for the identification of children at-risk in their development of adaptive behaviour skills necessary for the adequate navigation of daily life. These findings also highlight the need for the development of further support systems for caregivers who have identified a lack of social support in their daily lives.

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Abbreviations

MMT	Methadone Maintenance Treatment
UNODC	United Nations Office on Drugs and Crime
BMT	Buprenorphine Maintenance Treatment
HIV	Human Immunodeficiency Virus
NE	Non-Exposed
ME	Methadone-Exposed
NAS	Neonatal Abstinence Syndrome
CNS	Central Nervous System
PDI	Psychomotor Development Index
ASD	Autism Spectrum Disorder
FAS	Foetal Alcohol Syndrome
VSMS	Vineland Social Maturity Scale
VABS	Vineland Adaptive Behavior Scale
BASC-2	Behavior Assessment System for Children – Second Edition
OMT	Opioid Maintenance Treatment
SES	Socio-Economic Status
PedsQL	Pediatric Quality of Life Inventory
PSI	Parenting Stress Index
PRS-C	Parent Rating Scale – Child Form
MIP	Methadone in Pregnancy
CCDRG	Canterbury Child Development Research Group
PSS	Parenting Stress Scale
CI	Confidence Interval
HSCL-25	Hopkins Symptom Checklist

1 Introduction

1.1 Brief History of Opiate Use, Dependence, and Withdrawal

Opiates are naturally occurring narcotics derived from the opium poppy, one of the oldest medicinal plants recorded in history (Schiff, 2002). Synthetic variants can be chemically created and exert similar effects as the naturally occurring substances; these are referred to as opioids. Human beings have a long history of recreational use of synthetic and non-synthetic opiates, documented as early as 4,000 BC (Gruber, Silveri, & Yurgelun-Todd, 2007).

Use of opiates and opioids is contingent on their euphoric and analgesic properties. Morphine was the first compound isolated from opium in 1805, with the less potent codeine isolated in 1832; both were intended as analgesics (pain relief; Martinez-Fernandez et al., 2002). After the invention of the hypodermic needle in 1853, morphine was used as an analgesic for war wounded soldiers. However, this led to subsequent addiction due to the affinity of morphine for endogenous opioid receptors in the brain (Schiff, 2002). The addictive potential of morphine spurred the search for synthetic, non-addictive opioids, resulting in the synthesis of heroin in 1874 (Martinez-Fernandez et al., 2002).Heroin was initially used as a cough suppressant before its greater addictive qualities, such as faster absorption into the brain, were realised (Schiff, 2002). Heroin abuse reached epidemic proportions after World War II and this resulted in the development of methadone maintenance treatment (MMT) programmes introduced by Dole and Nyswander (1965). Methadone used in MMT was first synthesised in 1946 as an analgesic prior to World War II until its effective properties against heroin withdrawal were discovered (Dole, 1980; Joseph, Stancliff, & Langrod, 1999).

Opiates can enter the body in various ways, with multiple actions on specific brain regions and neurotransmitters. Currently, opiate use involves injecting, inhaling or smoking,

which produces a sensation described as a ‘rush’: intense pleasure and euphoria caused by the binding of opioids with opiate receptors (mu, kappa and delta) found in the brain (Deering et al., 2008; Gruber et al., 2007). This ‘rush’ is followed by a period of several hours of sedation, during which users feel content and relaxed. The effects of a single dose will wear off within three to five hours (Schiff, 2002). Heroin activates the μ-opioid receptor, producing the strongest analgesic action (compared with kappa-opioid receptors producing a modest analgesic action and delta-opioid receptors producing a weak analgesic action) and is regarded as the primary site for the acquisition of addiction and physical dependence on opiates (Chiara & North, 1992; Gruber et al., 2007; Johnson, 2000). The rewarding effects of opiates can be further attributed to the activation of the dopamine system in the limbic region, resulting in both the abuse and subsequent dependence of the users (Chiara & Imperato, 1986). This is particularly fast in opiate and cocaine users who have been shown to exhibit the shortest time between onset of abuse and dependence (Gruber et al., 2007).

Once dependence has developed, it is difficult for users to maintain a drug-free existence due to quickly developing withdrawal symptoms after the cessation of drug use (Amato, Minozzi, Davoli, & Vecchi, 2011).Acute withdrawal typically begins within six to twelve hours after the last dose. Withdrawal is characterised by craving for the drug, anxiety, dysphoria (emotional state characterised by anxiety, depression or unease), gastrointestinal upset, insomnia, yawning, mydriasis (dilated pupils), piloerection (erection of hair on skin), restlessness, sweating, irritability, myalgia (muscle pain), increased pain sensitivity, abdominal cramps and vomiting, diarrhoea, tachycardia (increased heart rate), increased blood pressure, and fever (Gruber et al., 2007; Schiff, 2002).

1.2 Opiate Dependency in New Zealand

Use of opioids in New Zealand is relatively high in comparison to international rates with an annual prevalence of opioid use of 1.3%, globally placing New Zealand 12th in the world (United Nations Office on Drugs and Crime [UNODC], 2011). A 2007/2008 New Zealand Alcohol and Drug Survey provided evidence that first time opiate use occurred at a median age of 19, with a peak in opiate use generally occurring within the 25-34 age bracket (Mason, Hewitt, & Stefanogiannis, 2010). Overall, 3.6% of New Zealanders aged between 16 - 64 years of age have used an opiate for recreational purposes in their lifetime (Mason et al., 2010). Further, nearly 80% of a New Zealand cohort within the Christchurch Health and Development Study had used illicit drugs by the age of 25 years, with 3.7% using opiates (heroin and morphine) for recreational use and 1.2% classed as dependent (Boden, Fergusson, & Horwood, 2006).

At present there is no exact data of people with opioid dependence in New Zealand, but current estimates place dependence at 9,000 – 10,000 users (within a population of ≈4.5 million; classified as daily use or almost daily use) (Adamson et al., 2012; Deering et al., 2011). This figure does not account for individuals in prison or those with mild dependence (less than six times a week) (Deering et al., 2011). The largest New Zealand based population of opiate users has been recorded within the South Island, specifically within the city of Christchurch (Adamson et al., 2012). These estimates have been inferred through overall opioid overdose death rates, which are three times higher than in the rest of New Zealand.

The use of opioids within New Zealand has significantly changed, moving from the use of heroin to the production of 'home bake' (a substance derived from a chemical process converting codeine to morphine) (UNODC, 2014). In the 1970's successful border controls against the importation of heroin were implemented, contributing to relatively low availability in New Zealand changing patterns of opioid consumption (Newbold, 2000).

Unfortunately, this resulted in higher illicit use of methadone and morphine derived from codeine based pharmaceuticals which remains a cheaper alternative to imported heroin (Newbold, 2000; UNODC, 2014).

1.3 Methadone Maintenance Treatment

Methadone maintenance treatment (MMT) is widely regarded as the 'gold standard' in terms of treatment for opioid dependency. This programme involves a multi-disciplinary approach targeting opioid use, criminal activity, and physical and mental health (Joseph et al., 1999). Comparisons of MMT and buprenorphine maintenance treatment (BMT; another programme for opioid dependency) demonstrate that both programmes are equally effective at reducing illicit opioid use, whilst MMT is overwhelmingly considered more effective in terms of treatment retention (Amato et al., 2005; Bell & Mutch, 2006; Fingerhood, King, Brooner, & Rastegar, 2014; Fischer et al., 1999; Mattick, Breen, Kimber, & Davoli, 2014; Petitjean et al., 2001; Pinto et al., 2010).

An individualised methadone dosage is required due to variable heroin dependency within patients. At the beginning of MMT an induction phase is completed to determine a sufficient oral dose of methadone (Joseph et al., 1999). An adequate dose of methadone is established on the achievement of four principal effects: relief of craving, relief of withdrawal symptoms, blocking of the narcotic effects of heroin and preventing sedation (Joseph et al., 1999). Additional services involve urinalysis to monitor illicit drug use, counselling services to help the patient with issues surrounding opioid dependence and factors that led to the initiation of opioid use, and vocational services (Tellioglu, 2010; Ward, Hall, &Mattick, 1999).

There are multiple benefits for individuals involved in MMT programmes on both biological and functional levels. Biologically, methadone prevents opioid withdrawal whilst

preventing sedation, as well as blocks the euphoric effects of other opioids. The prevention of withdrawal is achieved due to methadone's longer half-life (between 24 to 36 hours); this provides a less intense 'rush' than that associated with heroin, with similar, analgesic effects as morphine leaving the addict less sedated (Brownstein, 1993; Dole, 1980; Dole & Nyswander, 1965; Joseph et al., 2000; Scott & Chen, 1946; Ward et al., 1999). The euphoric effects of any other opiates taken are blocked due to cross-tolerance, however similar effects are not observed in drugs such as cocaine and benzodiazepines, or common substances such as alcohol and tobacco (Dole, 1980; Dole & Nyswander, 1965; Farrell et al., 1994; Ward et al., 1999; Scott & Chen, 1946).

Functionally, benefits of MMT include greater performance in everyday life, reductions in crime as well as reductions in fatalities and illness in relation to drug use. The advantages of a reduction in sedation in using methadone allows for continuance of a relatively normal life, for example working in paid employment, obtaining higher education, looking after children and general social functioning (Brownstein, 1993; Goldstein & Herrera, 1995; Scott & Chen, 1946; Ward et al., 1999). A notable reduction in criminal behaviour associated with drug taking and seeking, such as violent crime and theft has been observed; although these behaviours are not entirely eliminated (Farrell et al., 1994). In addition to this arrest rates for individuals within MMT are decreased compared to those still on heroin (Ward et al., 1999). Further benefits have been observed in the reduction and spread of infectious diseases, such as hepatitis B/C and human immunodeficiency virus (HIV)/AIDS, through contaminated needle use. Overdose mortality rates have also reduced along with an increase in general medical contact (Deering et al., 2008; Gruber et al., 2007; Jones, Finnegan, & Kaltenbach, 2012; Ward et al., 1999).

1.4 Methadone Maintenance Treatment in Pregnancy and the Impact on the Neonate and on the Child

Since the 1970's, the standard treatment of choice for pregnant opiate addicts has been MMT, despite a lack of scientific information (Kandall, Doberczak, Jantunen, & Stein, 1999). Women addicted to opiates were initially enrolled in MMT during the mid-1960s amidst concerns hormonal changes may confound therapeutic findings (Kandall et al., 1999). Pregnant women who were addicted to opiates (or any illicit drug of abuse) presented a significantly greater problem due to obstetrical and medical complications that could arise, greater withdrawal potential, and a lack of prenatal care (Finnegan, 1991). During the late 1960's pregnant opiate addicts began to experience beneficial effects from enrolment in MMT (Kandall et al., 1999). Methadone maintenance treatment became a more accepted treatment option, although short-term and long-term effects of methadone on the mother, foetus and resultant child were not fully understood (Kandall et al., 1999). To date research has provided greater knowledge of both the benefits and risks of MMT on the pregnant opiate addict, as well as the outcomes for the neonate, infant and child.

1.4.1 Benefits of methadone maintenance treatment in pregnancy. Benefits of MMT for the pregnant opiate addict are numerous due to an increase in prenatal clinic visits, medical and obstetric care, and corrections of nutritional deficiencies, in addition to benefits previously discussed for non-pregnant opiate addicts (Kandall et al., 1999). Increased prenatal clinic visits allows for treatments of medical conditions such as anaemia, skin infections and dental caries along with other conditions associated with a drug seeking lifestyle (Kandall et al., 1999). Treatment of STIs that can be harmful to both mother and unborn child can be treated along with other infections such as septicaemia, cellulitis and bacterial endocarditis (inflammation of the inner layer of the heart) (Finnegan, 1991).

Enrolment in MMT further allows for correction of nutritional deficiencies due to poor appetite, dietary intake and additional problems with metabolism and malabsorption resulting from drug use (Finnegan, 1991; Kandall et al., 1999). Further, increases in obstetric care also allow monitoring and management of conditions including, but not limited to, pre-eclampsia, abruption placentae, placental insufficiency, amnionitis, spontaneous abortion, intrauterine death, and premature labour, all of which may lead to the death of both the mother and foetus (Finnegan, 1991; Kandall et al., 1999). Further benefits are also observed for the neonate.

1.4.2 Benefits and risks of methadone maintenance treatment on neonatal outcomes.

Studies have shown multiple benefits for neonates prenatally exposed to methadone in comparison to those prenatally exposed to heroin in utero. Neonates born to mothers enrolled in MMT will experience a more stable intrauterine environment, unlike neonates born to mothers abusing heroin who will undergo fluctuations of intoxication and withdrawal, placing the foetus under greater stress (Jarvis & Schnoll, 1994). Previous research has also shown increased birth weight and head circumference in comparison to those infants prenatally exposed to heroin, however this is still reduced in comparison to non-exposed (NE) infants (Chasnoff, Schnoll, Burns, & Burns, 1983; Hans, 1996; Jarvis & Schnoll, 1994; Kaltenbach & Finnegan, 1987; Kandall et al., 1976; Lifschitz, Wilson, Smith, & Desmond, 1985; Rosen & Johnson, 1982; Wang, 1999; Wouldes & Woodward, 2010). Lower birth weights are hypothesised to be due to foetal growth retardation, as these infants are still small when gestational ages are within the normal range (Arlettaz et al., 2005). Positive effects observed with infant birth weights when mothers are engaged in MMT, can be eliminated by the concurrent use of heroin during pregnancy (Hulse, Milne, English, & Holman, 1997). This may be the result of exposure to multiple opioids or associated environmental and behavioural factors associated with drug use as well as a reduction in

prenatal care associated with a return to drug seeking behaviour (Hulse et al., 1997).

Although there are benefits of MMT for the neonate, methadone-exposed (ME) infants are reported to have an increased risk and severity of neonatal abstinence syndrome (NAS) in comparison to heroin-exposed infants (Johnson, Greenough, & Gerada, 2003; Kenner & D'Aplito, 1997). One study suggests between 60% to 80% of ME infants will suffer prolonged NAS (Bandstra, Morrow, Mansoor, & Accornero, 2010).Withdrawal symptoms of NAS involve both the central nervous system (CNS) and the gastrointestinal system (Hayford, Epps, & Dahl-Regis, 1988; Jansson & Velez, 2012). Some CNS effects include irritability, hyperactivity, increased muscle tone, high-pitched crying, inability to sleep, and hyperactive deep tendon reflexes (Hayford et al., 1999; Huestis & Choo, 2002; Jansson & Velez, 2012). Infants may also experience Gastrointestinal symptoms including poorly coordinated and frantic sucking resulting in poor feeding, vomiting, diarrhoea and weight loss (Hayford et al, 1999). Further reported symptoms can include autonomic dysfunction (yawning, sneezing, mottling, nasal stuffiness and fever), respiratory distress, and poor temperature regulation and in severe cases tremors, seizures and ultimately death (Hayford et al, 1999; Huestis and Choo, 2002; Jarvis & Schnoll, 1994). These withdrawal symptoms may occur shortly after birth or up to two weeks of age, and may last from a few days up to eight weeks resulting in longer hospital stays and health service expenditure (Hayford et al, 1999; Huestis and Choo, 2002). Severity of NAS within the infant is likely to be initiated and perpetuated by a number of inter-related factors including other poly-drug use involving both licit and illicit substances, along with maternal nutrition and the infant's environment (Jansson & Velez, 2012; Johnson et al., 2003).

1.4.3 Effects of methadone maintenance treatment on the child. Longer term effects of prenatal methadone exposure beginning in infancy and continuing into early

childhood may occur in a number of areas including cognitive development, physical development, motor development, language and communication development, behavioural development and social-emotional development. Research in this area has produced inconsistent findings with most research conducted in infants and pre-school aged children (Behnke et al., 2013). Summaries of findings within these developmental domains have been included below.

Cognitive development. Cognitive development is one of the most well studied areas of development in infants and children prenatally exposed to methadone. However this research also provides mixed results across a range of ages and a range of cognitive measures. Several studies have reported no signficant differences between ME and NE children on cognitive development scores (de Cubas & Field, 1993; Strauss, Starr, Ostrea, Chavez, & Stryker, 1976; Wilson, Desmond, & Wait, 1981). Other studies have reported fluctuations within development between the normal range at inital assessment, to the emergence of signifcant differences during later follow-ups, to no signficant differences at even later follow-ups (Hans, 1989; Johnson, Diano, & Rosen, 1984; Rosen & Johnson, 1982). Further to this, Lifschitz ,Wilson, Smith, and Desmond (1985) reported no signficant differences in cognitive development between ME, heorin-exposed and NE children. Other studies have reported signficant differences between ME and NE children at both initial assessments and follow-up assessments (Hunt, Tzioumi, Collins, & Jeffery, 2008; Johnson , Glassman, Fiks, & Rosen, 1990).

Physical development. Previous studies in physical development of ME infants and pre-schoolers aged between 3 months and 3 years have produced inconsistent findings. No significant differences have been reported between infants prenatally exposed to methadone and NE infants on measures of head circumference, height or weight (Hunt et al., 2008; Rosen & Johnson, 1982; Strauss et al., 1976; Wilson et al., 1981). In addition Lifschitz et al.

(1985) have also not found a signficant difference for head circumference, height or weight in ME, heorin-exposed and NE children. However signficant differences have been observed in a number of studies highlighting a signficant difference between height (Hunt et al., 2008) as well one study indicating ME children as more likely to have a head circumference below the tenth percentile (Johnson et al., 1990).

Motor development. Motor development has been assessed within previous literature to include both gross motor skills and fine motor skills. A number of studies have found ME children to remain within normal limits as measured on the Psychomotor Development Index (PDI) yet significant differences were evident in comparison to NE children (Strauss et al., 1976, Wilson et al., 1981). Other studies have recorded a change in motor skills as the child ages in comparison to NE children with no significant differences in motor skills at a younger age, resulting in signficant differences or poorer outcomes upon further follow-up (Chasnoff et al., 1983; Hans, 1989; Hunt et al., 2008; Johnson eet al., 1984; Rosen & Johnson, 1982). Previous research has further reported signficantly poorer fine motor skills in ME children in comparison to NE children (Hans, 1989; Wilson et al., 1981).

Language and communication. Language and communication within a ME sample is relatively limited. In a study by Hunt et al. (2008) ME children scored signficantly lower than comparison children on measures of expressive language and verbal comprehension indicating a lack of language skills. Davie-Gray (2011) also assessed language outcomes in ME children at 2 years of age and found significantly poorer language skills in these children than comparison children; however these effects were explained by extenuating family factors.

Behavioural development. This area of development is relatively understudied in ME children with only a number of studies investigating behavioural development across a range of ages. Whilst two of the studies included have shown significant differences between ME

children and NE children in attention levels (Wilson et al., 1981) as well as hyperactivity and internalising and externalising behaviour (de Cubas & Field, 1993) other studies have not found a signficant difference (Hans, 1989; Wilson et al., 1981).

Social-emotional development. The few studies to have investigated social-emotional development in ME children consistently report a number of socio-emotional deficits in opiate-exposed children than NE comparison children. Some of the socio-emotional deficits include difficulties with peer relationships (Lean, 2012), social competency (Hunt et al., 2008; Soepatmi, 1994), insecure attachment (Rodning, Beckwith, & Howard, 1989), and feelings of anxiety and rejection (de Cubas & Field, 1993).

Multiple theories have been posited as to the indirect and direct effects of prenatal methadone exposure on children's development such as the "double jeopardy" effect (Zuckerman & Brown, 1993). This model describes that not only are these children prenatally exposed to methadone, but also experience adverse environmental factors growing up in families affected by drug abuse, further impacting normal child development (Lester, 1998). Environmental factors that influence childhood development include tobacco use during pregnancy, poor nutrition, current familial drug use, single parenthood, foster placement, parental psychopathy and abuse (Hunt et al., 2008; Konijnenberg & Melinder, 2011). Age can also play a role in determining whether children have been affected by prenatal drug exposure, with some deficits not being apparent until older age. Child outcomes in relation to these factors may also impact caregivers in return (Lester, 1998)

As shown by past studies there is a gap in research into the effects of prenatal methadone exposure on older middle-school aged children, with the majority of research conducted in infants and children of pre-school age. Past research also highlights a gap in findings on how these children function in their day-to-day lives and actively engage in their surroundings, instead focussing more on specific areas of development. Older children will

begin to have greater levels of independence; so the assessment of how these children fulfil these daily requirements has become increasingly important, and as such cannot be captured in standardised developmental test scores. The current study will attempt to address the gaps in research as to the effects of prenatal methadone exposure on adaptive behaviour in 9 year old children.

1.5 Overview of Adaptive Behaviour Outcomes in the General Population and in Children Prenatally Exposed to Methadone

Adaptive behaviour/adaptive functioning is defined as the performance of daily activities necessary for social and personal fulfilment (Sparrow, Balla & Cicchetti, 1984). This definition is consistent with earlier definitions by Doll who initially defined adaptive behaviour as "the functional ability of the human organism for exercising personal independence and social responsibility" (Doll, 1953, p.10).

The assessment of adaptive behaviour has its roots in the field of intellectual disability, with the majority of research conducted in those with autism spectrum disorder (ASD), foetal alcohol syndrome (FAS), and developmental delays; however the assessment of adaptive behaviour in all individuals has become more significant (Cicchetti & Sparrow, 1990). Adaptive behaviour assessment allows measurement of how the person copes and adapts to daily living (Bornstein & Hahn., 2007) and has been designed to include four critical elements: that adaptive behaviour is age-related; is defined by societal expectations; is measured in terms of typical behaviour not ability; and is modifiable (Cicchetti & Sparrow, 1990).

Adaptive behaviour was initially assessed using the Vineland Social Maturity Scale (VSMS; Doll, 1953). The Vineland Adaptive Behaviour Scales (VABS; Sparrow et al., 1984) focused on four areas of development in the assessment of adaptive behaviour including

communication, daily living, socialization and motor skills. Both are used to assess levels of social and personal sufficiency of individuals between birth and adulthood. More recently, Reynolds and Kamphaus (2004) have included an adaptive behaviour scale within their Behaviour Assessment System for Children - Second Edition (BASC-2). This scale focuses on five different areas of development to determine adaptive behaviour including adaptability, activities of daily living, functional communication, leadership skills and social skills.

As the child becomes older, their level of adaptive behaviour and functioning will increase. Adaptive behaviour in children from birth to preschool years includes: attending to environmental stimuli, beginning to learn and master the alphabet, self-feeding with a fork or a spoon, washing and drying the face without assistance, showing a preference for some friends over others, and walking down stairs without assistance (Cicchetti & Sparrow, 1990). Disorganised rather than adaptive behaviour may result in impairment of these basic functions of feeding, sleeping and the communication of cues to caregivers (Velez & Jansson, 2008). In pre-schoolers (aged 2 to 5 years old) this is characterised by adaptive behaviours such as sharing toys, taking turns and adjusting to new surroundings (Reynolds & Kampahus, 2004). Pre-schoolers will also begin deciding what to wear without help (activities of daily living), basic social skills/social competence (can encourage others, saying please and thank you), and communicating clearly (Reynolds & Kamphaus, 2004). In addition, they should also be able to provide information such as their full name and home address when asked (functional communication) (Reynolds & Kamphaus, 2004). In older children (aged 6 to 11 years) this is characterised by further attainment of social skills (showing interest in others' ideas), the ability to express ideas and communicate comprehensively and perform everyday tasks safely (Reynolds & Kampahus, 2004).

1.5.1 Adaptive behaviour outcomes of children prenatally exposed to methadone.

To identify existing published studies concerned with the adaptive behaviour outcomes of children who were prenatally exposed to methadone, a comprehensive database search was conducted. The databases PsycINFO, PubMED, ScienceDirect, and Google Scholar were systematically searched for relevant articles. Study selection criteria included prenatal opiate exposure (heroin, methadone, and/or poly-opiates); children from birth to 12 years of age; and included outcome measures assessing child adaptive behaviour/ functioning and criteria including activities of daily living, adaptability, functional communication (expressive, receptive and written communication), leadership skills and social skills/ competencies. These criteria also included both longitudinal and cross-sectional studies. Using these criteria, five studies were identified that assessed aspects of adaptive behaviour. Of the selected studies, three studies discussed the impact of prenatal methadone exposure on adaptive behaviours in pre-school aged children, whilst the other two included studies reported on the impact of prenatal methadone exposure on adaptive behaviours in middle-school aged children. These studies have been summarised in Table 1 below.

A recent study by Hunt et al. (2008) assessed multiple domains of development in children prenatally exposed to methadone including, social competence at 18 months old and 3 years of age and language skills in children at 3 years of age only. Hunt et al. recruited pregnant women enrolled in a methadone maintenance treatment between 1979 and 1984. A comparison sample of non-dependent women was recruited from the same hospital during this time. Methadone-dependent mothers were excluded from the study if they were not following the MMT programme correctly (this was achieved through regular urine screening for other drugs of abuse and attending regular clinic visits). Both groups were matched for age, ethnicity, height and obstetric history. Assessment of children at both ages involved the VSMS for which ME children scored significantly lower at both assessments. Hunt et al.

further reported deficits in both expressive language and verbal comprehension as measured by the Reynell Expressive Language Scale and Verbal Comprehension A Scale. These researchers reported deficits in ME children's social competency as an overall lower total composite score; however individual scores on the eight subscales within the VSMS were not reported. This would have permitted identification of the specific areas of social competence which were most affected. A further limitation was the attrition rate, with only 67 of the original cohort sample of 113 retained to the age of 3 (Hunt et al., 2008).

Another more recent study by Sarfi, Sundet and Waal (2013) examined adaptation in toddlers who were prenatally exposed to methadone or buprenorphine. All pregnant women in opioid maintenance treatment (OMT) were invited to participate dependent on a delivery date between 2005 and 2007. Mothers of NE children of a similar age were recruited from health care centres. Follow-ups of these children were conducted at 12 months, 1.5 years of age and 2.5 years of age. Findings from this study pertain to the follow-up at 2.5 years of age. Within this study adaptation was examined using the Pediatric Quality of Life Inventory (PedsQL) which provides a measure of five subscales (physical, emotional, social, day-care functioning and psychosocial) and a total composite score. Sarfi et al. reported a significant difference between toddlers who have been prenatally exposed to methadone or buprenorphine in comparison to NE toddlers on all but one (emotional subscale) of the PedsQL subscales as well as the overall composite score. However upon further regression analyses adaptive behaviour appeared to be related to maternal distress levels over and above prenatal opiate exposure. Limitations to this study include a small sample size, as well as a lack of differentiation between groups prenatally exposed to buprenorphine and methadone (Sarfi et al., 2013).

The relationship between family living arrangement of children with or without prenatal cocaine and/or opiate exposure and children's adaptive functioning was investigated

by Bada et al. (2008). Mother-infant dyads were recruited at birth within the larger Maternal Lifestyles Longitudinal Study. Inclusion within the study was based on positive meconium assays for cocaine and opiate use. Non-exposed children were selected for comparison based on gestational age, sex and ethnicity. To assess adaptive behaviour, Bada et al. employed the use of the VABS (Sparrow et al., 1984). As previously described, the VABS consists of four domains including daily living skills, socialization, communication and motor skills, resulting in an overall adaptive behaviour composite score. Child living arrangement was also tracked and assigned to three different living arrangements; children living with their biological parents, living in relative care, or living in non-relative care. Bada et al. reported significant differences between children living with their biological parents, either exposed or not exposed and prenatally exposed children living in non-relative care on both communication, daily living skills and the total composite score. After covariate adjustment for potential confounds it was found that only prenatally exposed children in non-relative care had reduced scores in the daily living skills domain compared to those in relative and parental care. Higher adaptive functioning scores were attributed to several different factors such as higher caretaker education level, paternal involvement, female gender and larger head circumference, whilst lower scores in the total composite and all domains except motor were attributed to a greater frequency of caregiver changes. Although no drug effects were apparent the possibility of some effect cannot be ruled out, as drug exposure or associated conditions may have led to non-relative care placement. Long-term prenatal drug exposure effects may also be subtle in early childhood, so follow-ups at an older age are necessary. Further to these limitations children's exposure to opiates, cocaine or a combination of the two were not differentiated.

Similar to Hunt et al's. (2008) study, Soepatmi (1994) also investigated social competence in older heroin/ME children followed to the ages of 4 to 12 years of age. Within

this study social competence was assessed using the Child Behaviour Checklist Total Social Competence Score. Soepatmi reported that prenatally exposed boys at 4-5 years old and girls from 6-11 years old had an increased risk of social competency problems compared with NE children. Nevertheless, confounding factors may limit these findings; poly-drug use was not accounted for, and independent confirmation of drug use during pregnancy was not obtained such as meconium assay for opiate metabolites as children were recruited at 12 months of age. Direct effects of prenatal exposure on these children in terms of social competence cannot be determined due to the possible influence of these confounding factors.

The final study identified within this review was by de Cubas and Field (1993), who investigated both adaptive and maladaptive behaviour of children between the ages of six and 13 who were prenatally exposed to methadone (M = 8.5 years of age) versus a comparison NE group (M=7.8 years of age). Methadone-dependent mothers of school-aged children were contacted at random to participate in this study. The comparison group was recruited based on a number of demographic similarities. Using the Roberts Apperception Test for Children, de Cubas and Field investigated eight adaptive skills including: reliance on others; support-others; support-child; problem identification; limit setting; resolution 1 (unrealistic solution); resolution 2 (constructive solution of present situation); and resolution 3 (constructive solution going beyond present situation. A summary measure is not provided, however information is available on specific problem areas. No differences were found on this area of the Roberts Test although there was a reported tendency for comparison children to report more themes of reliance on others and supporting others; and fewer references to limit setting than ME children. These skills indicate the ability to use outside help to overcome problems in everyday life and the ability to give this assistance to others. Furthermore, ME children scored higher on a clinical indicator of maladaptive outcome. Limitations included a small sample size and no independent confirmation of drug use or poly drug use, along with the

potential confounding and compounding effects of cigarette and alcohol use on prenatal methadone exposure.

In summary, the previously reported studies provide mixed results as to the adaptive outcomes of children who have been prenatally exposed to methadone. The majority of this research has focussed on younger pre-school aged children due to a lack of appropriate longitudinal studies. Little research has investigated the effect of prenatal methadone exposure on adaptive behaviour outcomes specifically in middle-school aged children and neuro-social child development. The current study will be assessing the effects of prenatal methadone exposure on adaptive behaviour in children aged 9/10 years.

Effect of caregiver arrangement on adaptive behaviour in methadone-exposed children. While this research has provided mixed accounts of adaptive behaviour findings, additional confounding factors such as caregiver and living arrangement has played a significant role in ME children's development as shown in Bada et al. (2008). Within previous research by Davie-Gray (2011) and Lean (2012), ME children were more likely to be living out of home across a range of ages. Davie-Gray (2011) investigated a sample of ME children at age 18 months and found that ME children were significantly more likely to be living in out of home care in comparison to NE children. Lean (2012) further reported in a sample of ME children aged 4.5 years old that 43% had experienced at least one foster care placement. Investigation into the effects of caregiver arrangement on adaptive behaviour will be further explored within the current study.

Table 1
Summary of Adaptive Behaviour Outcomes in Prenatally Opiate-Exposed Children

Study	**Study Design**	**Objectives**	**Group(s) of interest**	**Comparison Group(s)**	**Outcome Measures**	**Findings**	**Study Strengths**	**Limitations**
Hunt et al.(2008)	Case-control, longitudinal , follow-up at 18 months and 3 years	To examine the development of social maturity in children prenatally exposed to methadone and diagnosed with NAS	ME *N = 133* 18 months *N=79* 3 years *N = 67*	NE *N = 103* 18 months *N=61* 3 years *N = 44*	Vineland Social Maturity Scale	ME sample had significantly lower mean social maturity scores than NE sample at 18-months and 3-years *(p <.05)*	Matched sample for age, height, ethnic background and previous obstetric history, poly-substance using mothers excluded from study through regular urine screening as well as control participants	Antenatal participation, no identification of individual competency scores, high attrition rate, bivariate analyses only
Sarfi, Sundet, & Waal (2013)	Prospective, longitudinal, follow-up at 2 ½ years.	To examine the relationship between caregiver reported stress and adaptive functioning in children prenatally exposed to methadone or buprenorphine	ME *N* = 24 Buprenorphine-exposed *N* = 12	NE *N* = 35	Pediatric Quality of Life Inventory (PedsQL): PedsQL physical scale PedsQL emotional scale PedsQL social scale PedsQL day care functioning PedsQL psychosocial scale	Significant differences on all subscales of the PedsQL (*p*<.01 or *p*<.05) except for the emotional subscale as well as the PedsQL total scale. Peds QL significantly related to maternal distress (anxiety and depression) levels	Meconium assay for confirmation of maternal drug use for both opiate-exposed and NE groups, low attrition rate	Small sample size, reporting bias, no differentiation between methadone and buprenorphine exposure, no account for additional confounding factors

Table 1
Summary of Adaptive Behaviour Outcomes in Prenatally Opiate-Exposed Children

Study	**Study Design**	**Objectives**	**Group(s) of interest**	**Comparison Group(s)**	**Outcome Measures**	**Findings**	**Study Strengths**	**Limitations**
Bada et al.(2008)	Prospective longitudinal, follow-up at 3-years old	To examine whether there is an effect of living arrangements of children with/out prenatal drug exposure on behavioural outcomes and adaptive behaviour	Cocaine/ Opiate exposed: Parental care *n = 317* Relative care *n = 86* Non-relative care *n = 51*	NE: Parental care *n = 514* Relative care *n = 10* Non-relative care *n = 5*	Vineland Adaptive Behaviour Scale	Non-relative care associated with significantly lower scores in the daily living skills domain. Significant association between living arrangement and adaptive behaviour. Non-significant drug exposure effects	Large sample size, meconium assay for confirmation of maternal drug use and non-drug use in control sample, matched sample for gestational age, gender and race, multiple between groups comparisons	Combination analysis of cocaine and opiates, opiate use not specified, meconium assays not used for all confirmation of prenatal drug use
Soepatmi. (1994)	Case-control longitudinal study (4 – 12 years old)	Examine the effects of opiate exposure on children's social competency development	Heroin and/or ME *N = 91*	General population reference group *N = 66*	Child Behaviour Checklist TSCS sub score	Prenatally exposed boys at ages of 4-5 years old (p = .011) and girls from 6-11 years old (p = .009) were at an increased risk of social competency problems in comparison to NE children	Maternal confounds taken into account maternal SES, partner status, smoking in pregnancy, prenatal care compliance	No independent confirmation of drug use or poly-drug use during pregnancy (achieved from medical records)

Table 1
Summary of Adaptive Behaviour Outcomes in Prenatally Opiate-Exposed Children

Study	**Study Design**	**Objectives**	**Group(s) of interest**	**Comparison Group(s)**	**Outcome Measures**	**Findings**	**Study Strengths**	**Limitations**
de Cubas & Field (1993)	Case-control, cross-sectional study of children over 5 years old	To determine the effects of methadone exposure on social and emotional problems of children	ME *N=20*	NE *N=20*	Roberts Apperception Test for Children Adaptive skills subtest	No significant differences were found the on Adaptive skills subtest. Tendency for comparison children to report more themes of reliance on others, and fewer references to limit setting than ME children. ME exposed children scored significantly higher on a clinical indicator of maladaptive outcome (p<.01)	Matched sample demographically: age/grade level, sex, ethnicity, SES, family structure, maternal education, alcohol and nicotine use and perinatal complications	Outcomes were for children over 5, is a large age range 6-13yrs. Effects of methadone confounded by cigarette and alcohol use. No independent confirmation of drug use or poly drug use. Relatively small sample size

1.5.2 Methodological issues in adaptive behaviour research. The five studies reviewed suggest conflicting findings regarding the adaptive behaviour and associated skills in children prenatally exposed to methadone. These mixed findings may be in relation to the use of different measures in each study to assess similar adaptive behaviour skills. They may also be attributable to additional methodological issues within these studies.

With the exception of de Cubas and Field (1993), the majority of studies relied on maternal/caregiver report as the primary means of assessing adaptive behaviour outcomes in children. This can often result in reporter bias. For example, in Soepatmi's (1994) study, maternal report was gathered to assess social competence in children; however the children were of school age for a teacher to have contributed to the assessment of social competence within another context. A multi-informant design would have further added to the validity of these findings. Furthermore additional caregivers (if applicable) may have been of use to provide additional reports on adaptive behaviour outcomes where the child was not of school age (Hunt et al., 2008; Bada et al., 2008; Sarfi et al., 2013). None of the studies outlined used multiple reporters to assess adaptive behaviour in this area.

In addition to potential reporter bias, there are also limited considerations of confounding effects in all studies reviewed. These confounds may account for findings within the study that may have been attributed to another variable. For example, de Cubas and Field (1993) assessed children that were prenatally exposed to a number of other drugs in addition to methadone; this may have potentially confounding effects on their findings. Bada et al. (2008) accounted for the different living arrangements of children prenatally exposed to drugs, however there is a possibility that varied outcomes could be related to the conditions that led to the child being placed in care, instead of the living arrangement. There are also confounds regarding both opiate and cocaine use during pregnancy. Regression modelling

within the other three studies reviewed is lacking to determine if environmental factors help explain deficits in adaptive behaviour over and above prenatal methadone exposure.

Furthermore, within those studies presented, there is a lack of independent confirmation of drug use, with the majority of these studies failing to confirm any potential drug-use in their comparison samples. Hunt et al. (2007) and Sarfi et al. (2013) were the only studies that employed the use of regular urine screening for other drugs of abuse in women attending MMT/OMT and comparison participants within the study. A lack of independent confirmation of drug use can result in unreliable measures of full poly-substance exposure experienced by the foetus, especially from underestimation or falsely supplied information from the mother due to fear of judgement (Bada et al., 2008; de Cubas & Field, 1993; Soepatmi, 1994). Whilst Bada et al. (2008) implemented mandatory confirmation of negative meconium assays for children in the NE group, prenatal or opiate/cocaine exposure was only determined through positive meconium assays for a select group of mothers investigated in the study, whilst the remaining participants drug use was determined through admission.

Small sample sizes have also been evident in a number of the studies reviewed and can be a detriment to achieving appropriate statistical power in the detection of significant differences (de Cubas & Field, 1993; Sarfi et al., 2013). De Cubas and Field (1993) provided evidence suggesting some deficits in adaptive behaviour, but their total adaptive skills composite score did not reveal any differences. A larger sample size may have remedied this problem. There is also a high attrition rate within Hunt et al's. (2007) study, a problem often occurring within longitudinal studies. Children who are most at-risk may have been lost due to environmental instability often associated with families in which drug-use is present.

Lastly, there is a lack of published research focussing directly on the impact prenatal exposure may have on adaptive behaviour outcomes in older children. Only Bada et al. (2008) and Sarfi et al. (2013) used a measure encompassing all adaptive behaviours whilst

the remaining reviewed studies used measures contributing to select aspects of adaptive behaviour skills. Findings regarding adaptive behaviour or social competence have been presented in some cases as a minor finding with the majority of these studies focusing on behavioural and socio-emotional outcomes. The current study will investigate the effects of prenatal methadone exposure on adaptive behaviour outcomes of middle school children aged 9/10 years. The effects of prenatal exposure to methadone will be assessed in all domains of adaptive behaviour individually, including social skills, functional living, leadership skills, functional communication and adaptability, as well as a total score of adaptive skills (Reynolds & Kamphaus, 2004).

Whilst considering the effects of prenatal opiate exposure on the child's development, namely adaptive behaviour skills, there are additional effects on the caregiver that need to be considered. The current study will examine the stress levels associated with this caregiver role. This will be discussed in the next section.

1.6 Overview of Stress in Caregivers of Children Prenatally Exposed to Methadone

Stress has been defined as demands on the individual that exceeds their available resources for managing them (Burke, 1991). Within the existing literature, three major forms of stressors have been researched; this includes life events, chronic strains and daily hassles (Thotis, 1995). Life events include sudden changes such as job loss or divorce whilst chronic strains include persistent stressors such as poverty or marital problems, with the majority of the research focussed on these areas (Thotis, 1995). In comparison, daily hassles or routine stressors are mini-events during the day which can create stress such as work, family, money or other daily occurrences and is not well studied (Thotis, 1995). The aim of the current study will be to investigate routine stressors in the lives of caregivers of children prenatally exposed to methadone. These stressors will include general everyday life stressors as well as stress

involved in the parenting process more specifically. This will form the second major focus of this thesis.

1.6.1 General everyday stress. Daily hassles are described as distressing demands that characterise the everyday interactions with the wider environment in multiple domains of life (Crinc & Greenberg, 1990). These routine stressors may be an infrequent occurrence and cause minor frustration (Crnic & Greenberg, 1990). However, they can build up in a single day or a week and affect psychological well-being due consistent predictable demands that cannot be met (Crnic & Greenberg, 1990). This may involve not having enough time to spend with your family or partner, and not being able to see friends (Kanner, Coyne, Schaefer, & Lazarus, 1981). Furthermore, this may also involve not having sufficient money, issues with sleep or potential transport difficulties (Kanner et al., 1981). In addition to examining everyday general stress, the current study will also examine parenting stress separately. This is due to parenting stress being described as qualitatively distinct from other life stressors (Deater-Deckard, 1998).

1.6.2 Parenting stress. Parenting is a highly complex task and places caregivers within demanding situations presenting an increased risk for stress (Abidin, 1990; Deater-Deckard, 1998). Parenting stress has been defined as the difficulty that arises from the demands of parenting and the access to available resources in which to do so (Anthony et al., 2005; Deater-Deckard, 1998). The demands placed on the caregivers will change as the child grows. Stress in the parenting process has been hypothesised to be higher for caregivers who feel they have less knowledge and competence regarding child rearing, less support from friends and family, and when the child is viewed as more behaviourally difficult (Creasey & Reese, 1996; Deater-Deckard, 1998; Mash & Johnston, 1990).

1.6.3 Stress in caregivers of children prenatally exposed to opiates. To identify existing published studies concerned with the stress outcomes of caregivers of children who were prenatally exposed to methadone, a comprehensive database search was conducted. The databases PsycINFO, PubMED, ScienceDirect, and Google Scholar were systematically searched for relevant articles. Study selection criteria included prenatal opiate exposure (heroin, methadone, and/or poly-opiates); children from birth to 12 years of age; and included outcome measures assessing caregiver general daily stress and parenting stress. These criteria also included both longitudinal and cross-sectional studies. Using these criteria only one study has been identified and described below.

Kelley (1992) investigated stress experienced by caregivers (both biological and foster caregivers) of infants prenatally exposed to drugs (cocaine, cannabis, heroin and methadone) in comparison to biological caregivers of infants who were not exposed to drugs. Both groups were recruited from a teaching hospital for children. Infants who were prenatally exposed to drugs were recruited if there was a positive neonatal urine assay for drug metabolites, or if the mother self-reported drug use during pregnancy. Infants who were not exposed were matched in terms of age, race, gender and socio-economic status (SES). These children were aged between 1 and 33 months with an average age of 14 months. When the study took place, 40% of children in the drug-exposed group were removed from their mothers care and placed in relative and non-relative care. Parenting stress was measured using the Parental Stress Index (PSI) providing parent related stress, child related stress, life stress and an overall total stress score. Kelley reported that caregivers of children prenatally exposed to drugs scored higher on measures of total stress, parent related stress, and child related stress than caregivers of comparison NE infants. However no significant difference was observed on the life stress scale. This indicates a potential relationship between prenatal drug exposure and increased levels of parenting stress.

These findings may be compromised due to methodological limitations within the study including a relatively small, non-random sample. The extent of maltreatment that these children may have experienced, leading to their foster placement was also not recorded and may have potentially added to stress levels experienced by these caregivers. The NE group was also not independently assessed for drug use during pregnancy, relying on self-report. Furthermore, whilst all children were prenatally exposed to cocaine, only a small subsample was exposed to heroin and methadone with no control of poly-drug exposure. The current study will be investigating the effects of prenatal methadone exposure in children on parenting stress and general everyday stress in their caregivers. Additional research within this area is important as the effects of caring for a child who has been prenatally exposed to methadone is limited.

In addition to these findings, Kelley (1992) further reported that caregivers of infants prenatally exposed to drugs scored higher than comparison caregivers on child related stress in the areas of perceived hyperactivity/ distractibility and adaptability (Kelley, 1992). Kelley cited possible reasons for this increase in stress as due to infant characteristics that can make prenatally exposed children difficult to care for, such as a lack of adaptability. These findings present a potential relationship between child outcomes and caregiver stress. This will form the third major focus of this thesis.

1.7 Relationship Outcomes between Child Adaptive Behaviour Outcomes and Caregiver Stress

As previously mentioned child adaptability can potentially play a role in the stress experienced by caregivers. A direct association between child adaptability, as well as other child adaptive behaviour skills and the stress experienced by their caregivers, both in

everyday life and in the parenting process may be evident.. These studies have been summarised below.

1.7.1 Biological parent stress and child adaptive behaviour outcomes. Within current research, the relationship between child adaptive behaviour and caregiver stress has been examined primarily in biological caregivers of children diagnosed with an ASD or with an intellectual disability. Hall and Graff (2011) reported that biological parents (both mothers and fathers) of children aged 21 and under (Mean age = 8) with ASD, have described their child's adaptive behaviour deficits as a source of stress, further finding a significant correlation between deficits in child adaptive behaviour and increases in parenting stress specifically. This relationship only remained significant in fathers, with mother's distress accounting for their increases in stress. Davis and Carter (2008) also found mixed results for each biological parent of autistic toddlers and reported levels of parenting stress. The most consistent predictor of parenting stress for both mothers and fathers was delays in their child's social skills. For fathers, observed social interaction skills were the most predictive of overall stress as well as parent–child relationship stress. Mothers who reported that their children had low levels of social relatedness also reported higher overall parenting stress, higher stress in the area of parent–child relationships and more parent distress. Tomanik, Harris, and Hawkins (2004), reported that aberrant and adaptive behaviour in children, aged between 2 and 7 years of age, with pervasive developmental difficulties accounted for a significant proportion of the variance in maternal stress. Beck, Hastings, Daley and Stevenson (2004) found that pro-social behaviour in children, aged between 3 and 19 years (Mean age = 9), with intellectual disabilities was an independent, negative predictor of maternal stress; however a composite measure of adaptive behaviour was not. Weiss, Sullivan, and Diamond (2003) further reported an association between adaptive behaviour in

children, aged between 9.3 and 42.5 years (Mean age = 24.9) with a developmental disability and self-reported parental stress in both biological mothers and fathers. Weiss et al. reported that lower levels of adaptive behaviour were predictive of higher levels of caregiver parenting stress in both parents.

Whilst the majority of this research supports a relationship between deficits in adaptive behaviour and increases in parenting stress, there are contradictions to these findings. Lecavalier, Leone, and Wiltz (2006) investigated both teacher and parent reported adaptive skills in children aged from three to 18 years and the relationship to parental stress. Lecavalier et al. did not find a significant relationship between child adaptive skills and parenting stress and reported further differences in assessments between the teachers and the parent's ratings of adaptive behaviour. Peters-Scheffer, Didden and Korzilius. (2000) also found no significant effect of child adaptive behaviour on maternal stress measured over several time points across 2 years. This was examined across a range of ages from two to nine years. As previously discussed in the first literature review, Sarfi et al. (2013) investigated adaptive behaviour outcomes in children prenatally exposed to methadone or buprenorphine in comparison to NE children. The primary aim of this paper however, was to investigate a relationship between child adaptive behaviour outcomes and parenting stress as well as other maternal variables. Sarfi et al. also reported no significant relationship between parenting stress and the child's adaptive behaviour within the child domain or the parent domain of stress recorded with the PSI. This was then further examined in a regression analyses in which Sarfi et al. investigated the impact of parenting stress on adaptive behaviour and further found no significant prediction.

Contrary to all other studies examined, Rivard, Terroux, Parent-Boursier and Mercier (2014) reported a positive relationship between child adaptive behaviour and parenting stress. Higher levels of adaptive behaviour in four-year-old children were associated with higher

levels of parenting stress in both mothers and fathers. Rivard et al. described their findings in relation to the stress these parents may be experiencing as their child is transitioning to school in the next year. Rivard et al. further go on to describe these differences due to the child's age expected competencies which may seem more apparent as the child gets older.

1.7.2 Foster caregiver stress and child adaptive behaviour outcomes. Whilst there is a wealth of research on the effects of child adaptive behaviour on their biological caregivers stress, only one study has investigated the effects on stress experienced by foster or adoptive caregivers. Paley, O'Connor, Frankel and Marquardt (2006) investigated this relationship in children aged between 6 and 12 years who were prenatally exposed to alcohol. The majority of children within this study were either with adoptive or foster caregivers whilst only 23 percent of children in this study were with their biological caregivers. The adaptive behaviour of the child was both an independent and significant predictor of child-related stress as measured by the PSI. The custodial status of the caregivers was also a significant predictor of child-related stress in which adoptive or foster caregivers experienced greater stress than biological parents did. There was no significant effect on parent-related stress.

1.7.3 Caregiver stress and child adaptive behaviour outcomes. Finally, the relationship between caregiver stress and child adaptive behaviour has been examined in one study across a range of caregivers. Anthony et al. (2005) investigated the relationship between parenting stress and teacher rated social competency in pre-schoolers. Caregivers within this study included biological mothers, biological fathers, female relatives and foster parents. Whilst the majority of the other studies reported have examined this relationship with child adaptive behaviour predicting caregiver stress, Anthony et al. has investigated the

reverse relationship much like Sarfi et al. (2013). Parenting stress was reported to be the most predictive of children's social competency in the classroom suggesting a direct relationship between parenting stress and child social competence.

1.7.4 Caregiver stress and family socio-economic status. The current study will also control for the SES of the families involved. Stress has been hypothesised to be higher in those who are more economically disadvantaged (Mash & Johnston, 1990). The effect of SES on stress has been witnessed at both the social and biological level. Socially, lower SES is correlated with exposure to impoverished living standards and stressful life events (Baum, Garofalo & Yali, 1999). These environments more often lend themselves to higher incidents of neighbourhood crime, inadequate housing and poor sanitation (Baum et al., 1999). With an increase in the background stress in these individuals' lives, routine stressors may exert more of an effect, changing how these people may respond and adapt to new stressors (Baum et al., 1999). On a biological level, higher incidences of stress are evident in those individuals with lower SES (income/occupational status and education level). The stress hormone cortisol has been found to be lower in those people with higher SES with findings independent of gender and race (Cohen, Doyle & Baum, 2006). Decreases are also evident in the stress hormone and neurotransmitter epinephrine, with a non-significant decrease found in norepinephrine as well (Cohen et al., 2006).

In summary, the previously reported studies provide evidence as to a relationship between caregiver stress and child adaptive behaviour outcomes. The majority of this research has been conducted with biological caregivers; however the current study will be investigating the impact of child adaptive behaviour on a range of caregivers including biological mothers, biological fathers, other relatives and foster caregivers. A measure of SES

will also be considered within this thesis when investigating a relationship between stress and adaptive behaviour.

1.7.5 Methodological issues in research investigating the relationship between caregiver stress and adaptive behaviour in methadone-exposed children. The studies reviewed primarily suggest a significant relationship between child adaptive behaviour and parenting stress experienced by their caregivers. However the correlational designs of these studies does not allow for the determination of causality or directionality between caregiver stress and child adaptive behaviour. In addition to this, further methodological issues are present in this research.

Firstly, there is a lack of research investigating the effects of child adaptive behaviour on a wider variety of caregivers that children may have. Only one study investigates this relationship in both biological parents, foster caregivers and other relatives (Anthony et al., 2005). These findings would be beneficial as different caregivers experience stress differently. Within research examining the effects of prenatal alcohol and other drug exposure, the biological mother may still be under the influence of these substances, or may still carry unresolved feelings due to this substance use during pregnancy (Paley et al., 2006). Fathers will also experience stress differently to mothers as evidenced in the studies reviewed in which different aspects of their child's adaptive behaviour influenced different areas of paternal stress (Davis & Carter, 2008; Hall & Graff, 2011; Weiss et al., 2003). These differences are further extended to foster or adoptive parents who will also experience stress differently compared to the biological parents of these children. These foster parents may in turn be made up of biological relatives of these children such as grandparents who will also experience stress differently. These grandparents are at a different stage of their lives and so their child's ability to function in daily life may affect them differently. The current study

will be including a wider range of caregivers due to the nature of caregiver arrangement of ME children as previously discussed.

Secondly, none of the studies reviewed have considered additional measures of stress such as general daily stress, which may be affected by the child's adaptive behaviour. An additional measure of stress in this area would allow for the investigation as to the effects of child adaptive behaviour skills in multiple areas of these caregivers lives. The current study will be assessing both parenting stress and general stress and the relationship with child adaptive behaviour.

Research Aims and Hypotheses

The current study aims to expand on previous research by examining adaptive behaviour outcomes in ME children at age 9/10 years. This study will take into account the effects of risk factors such as family SES of the caregivers, as well as assess the effect these behaviours have on caregiver stress. To date, adaptive behaviour has not been assessed in this high risk group in regards to the effect on caregiver stress. This research aims to provide an evaluation of how well these children cope with and perform in the real world, and the extent to which this affects stress experienced by their caregivers.

The specific study aims and hypotheses are as follows:

1. To assess the performance of ME children in comparison to NE children on adaptive behaviour outcomes at 9-10 years. This study will measure adaptive behaviour with The Behaviour Assessment System for Children – Second Edition (BASC-2) using the Parent Rating Scale- Child form (PRS-C). The adaptive scales of the BASC-2 will be assessed for positive behaviours in home and community settings.

   It is hypothesised that ME children will have significantly lower scores on the adaptive behaviour scales including areas of activities of daily living, adaptability, functional communication, leadership and social skills as well as the overall composite score in the caregiver BASC-2.
2. To assess differences in general stress and parenting stress between caregivers of ME children and caregivers of comparison NE children.

   It is hypothesised that there will be an increase in both general and parenting stress in caregivers of ME children compared with caregivers of comparison NE children.
3. To investigate the relationship between caregiver stress and child adaptive behaviour

   It is hypothesised that greater deficits in adaptive behaviour in ME children will be negatively correlated with an increase in both general and parenting caregiver stress.

2 Method

The current study contributes to an existing prospective longitudinal study drawing on research participants from the larger Canterbury Methadone in Pregnancy (MIP) study (Woodward et al., 2002). As a part of this longitudinal study, all MIP research participants had participated in assessments at term, and age's 18-months, 2-years, and 4.5-years. Ethical approval for the 9/10 year research participant assessments was obtained from the Ministry of Health Upper South Regional Ethics Committee (See Appendix A, Ref: URB/07/10/042). Ethical approval for measures used for recruited comparison participants were obtained from the Human Ethics Committee Low Risk (See Appendix B, Ref: HEC 2013/45/LR).

The focus of this research study was the 9/10 year data wave in which the author participated in all data collection: this included conducting all of the caregiver/maternal interviews, recruiting all comparison group participants with both participant group data entry and statistical analyses.

2.1 Research Design

The current study employs a cross-sectional research design.

2.2 Participants

Participants in the current study consisted of two groups of caregivers and their children. The first group consisted of 27 MIP study caregiver participants and 28 MIP study children (one caregiver had twins), of whom the original cohort were opiate dependent women. These women became pregnant and were recruited by a research nurse during their second or third trimester of pregnancy between 2003 and 2006 and were subsequently enrolled in the Christchurch Methadone Programme. This programme works in partnership with Christchurch Women's Hospital providing antenatal care through the Methadone in

Pregnancy Clinic (Lean, 2012).Exclusion criteria included infants born very preterm (≤ 32 weeks), with HIV, foetal alcohol syndrome or any other congenital abnormality, mother non-English speaking or unable to give informed consent and families who resided outside of the Canterbury region (Lean, 2012).

The second group consisted of 26 caregivers and their NE children who were recruited from the community between March 2013 and April 2014. The NE participants were caregivers with a child 9/10 years of age, and who had not been exposed to methadone during pregnancy. Due to the thesis time constraints a different recruitment procedure (described below) was employed for the NE group as the subsequent enrolment procedure employed in the larger MIP study did not permit recruitment of 30 NE comparison children who would have turned 9 years of age within the time permitted for thesis submission. Exclusion criteria for the NE group included children with atypical development, children with prenatal drug exposure and families who resided outside of the Canterbury region.

2.2.1Methadone-exposed sample. In the 9/10 year wave, 39 ME children were initially eligible for inclusion in the assessment by April 2014. Two children were withdrawn from the study for the following reasons: One child's parent refused to participate in the current follow-up, and a second child and their family no longer lived in New Zealand. Assessments have not been completed for 9 of the remaining children, leaving a total ME sample of 28 children and their caregivers. This produced a sample retention rate of 70.0% as shown in Figure 1.

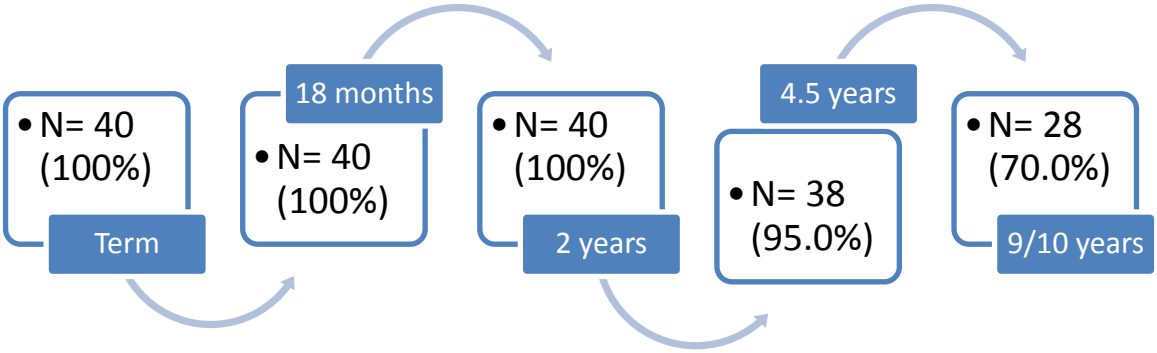

Figure 1. Retention rates for the methadone-exposed children from term to 9/10 years of age.

Caregiver definition. Over the course of the 9-year longitudinal MIP study, a number of children experienced placements with their relatives and also non-relatives, and had temporary and/or permanent caregiver arrangements. At term the primary caregivers were the biological mothers of the MIPs infants, however placement of these children has changed in the past nine years with 14 children being removed from their mothers care. Reasons for changes in caregiver placement include CYPS removal; custody granted to the father in cases of separation; mother remanded in custody; and parental death as shown in Table 2. At the 9-year assessment ME caregivers are comprised of biological mothers, biological fathers, relatives (e.g. grandparents) and other non-relative care (e.g. foster mothers) as shown in Table 3. The term caregiver is defined as the person who provides the child with their basic needs such as food, clothing and shelter, as well as ensuring a safe and caring home for the child (Child, Youth & Family, 2014). The term "caregiver status' is the term employed to include each of the caregiver arrangements in the current study.

Table 2

Reasons for Changes of Placement of Methadone-Exposed Children

	CYPS	Father	Parental Death	Prison
Displaced Children, % (N)	53.3 (8)	20.0 (3)	20.0 (3)	6.7 (1)

Note. N=14

Table 3

Placement of Methadone-Exposed Children from 18 months, 4.5 years and 9/10 years.

	18 Months	4.5 Years	9/10 Years
Biological Mother, % (N)	78.6 (22)	71.4 (20)	50.0 (14)
Biological Father Only, % (N)	3.6 (1)	10.7 (3)	14.3 (4)
Other Relative Care, % (N)	7.1 (2)	10.7 (3)	17.9 (5)
Non-Relative Care, % (N)	10.7 (3)	7.1 (2)	17.9 (5)

2.2.2 Non-exposed comparison sample. Caregivers of the NE comparison group consisted of solely biological mothers.

2.3 Procedure

2.3.1 Participant recruitment at 9/10 years old.

Methadone-exposed sample. When a child turned 9 years of age, a Canterbury Child Development Research Group (CCDRG) member contacted the caregivers by telephone to gauge interest in participating in the current round of 9/10 year wave. If the caregiver agreed to participate in the assessment an appointment time was made to attend the CCDRG research house. Following this initial phone call an information sheet was then sent out by land mail detailing the nature and aims of the current study. Appointments were then arranged and

confirmed either via the telephone call or by mobile text message a couple of days prior to the confirmed assessment.

Caregivers and children were directed into the Canterbury Child Development House situated at the University of Canterbury campus for a 3 hour caregiver interview and child assessment. Research participants were required to stay longer as the depth of questions asked of them in the interview was much more extensive, as well as the requirement of their children to be assessed. The ME caregivers who consented to the 9/10 year assessment were thanked for their participation with either a $20 petrol or grocery voucher of their choosing due to the protocols of the larger MIP study. For those who had to travel a significant distance, partial reimbursement of petrol was given with vouchers, or flight tickets were purchased.

Non-exposed comparison sample. Recruitment of NE caregivers and children from the Canterbury region occurred between 2013 and 2014 via community newsletters, word of mouth, and school newsletters (See Appendix C). Initial contact of NE caregivers was achieved by email, a telephone call or a text message. If the participant chose to send an email or text message, a reply email or text message was sent requesting telephone details, and an appropriate time to get in contact for a screening phone call. When the participant rang, a screening phone call was conducted during this first initial call. If the participant was eligible to participate, an information letter was sent either via post, or via email.

The assessment demand on the NE caregivers was much less than the ME research participants. The interview took on average 30 minutes to complete as they were only required to answer a selection of questionnaires from the caregiver interview, and their children were not being assessed which typically takes between 2.5 and 3 hours. Caregivers recruited as comparison participants living in the Canterbury region were given the choice of either a $10 petrol or grocery voucher due to available funds.

2.3.2 Consent procedure.

Setting. As previously described caregiver interviews took place at the Child Development House situated on the University of Canterbury campus. The interviews were held in the interview room so ME group caregivers could watch their child during assessments. Caregivers were directed towards a couch in the rear of the room whilst the interviewer took a seat opposite. A television was set up in the corner of the room with a direct feed to the assessment room, so the caregivers could listen as well as watch their children complete their assessments. After the interview process ME group caregivers also had magazines available to them to read whilst they waited.

Caregivers of NE children did not have either of these options as their child was not brought to assessments and they were free to leave once the interview was completed. If a parent could not make it to the CCDRG development house (reasons include illness in the family) then an interview was carried out at their residence with two trained interviewers in attendance.

2.3.3 Assessment procedure.

Methadone-exposed sample. On arrival at the CCDRG development house, the caregiver and child were directed into the assessment room to go over the consent process for the assessment. Prior to the interview, the author explained the assessment process for the current study and told that any information provided during the interview would be confidential, and anonymity assured due to assigned study identification numbers. Caregivers were reminded that they could withdraw from the study at any time. Caregivers were asked to provide written consent for their participation, for their child and for academic achievement data from teacher report which were then mailed to the child's teacher. At the end of the

assessment, the caregivers were provided with the contact details of the research team if they had any concerns related to the assessment (See Appendix D).

Once the consent procedure had been completed ME caregivers were offered and provided refreshments and then taken into the interview room and given a brief verbal overview of what the interview would contain. ME caregivers were required to answer a detailed maternal lifestyles interview which included a range of caregiver background information including aspects of caregiver age, family composition, marital status (as well as relationship satisfaction), caregiver educational achievement, child education, SES, caregiver mental health, caregiver parenting practices, the extent of licit (cigarettes and alcohol) and illicit substance use and stressful life experiences (See Appendix E).

In addition to these questions caregivers were required to answer the Behaviour Assessment System for Children – second edition (BASC-2) as well as the Sources of Stress Scale and the Parental Stress Scale. Teachers were also sent the Teacher Rating Scale- Child form (TRS-C) from the BASC-2. At the conclusion of the interview ME caregivers were thanked for their contribution and time and were offered refreshments again as they were required to wait in the interview room for their child's assessment to finish.

Non-exposed sample. For NE caregivers the consent process and interview were both carried out in the interview with refreshments also offered and provided. The consent process for the NE caregivers was the same process as described above for the ME caregivers however the interview process was markedly shorter (See Appendix F). Caregivers of NE children were given an abbreviated version of the interview, only being required to answer basic demographic questions such as family composition, marital status, educational achievement and SES. These caregivers were also required to answer the BASC-2, Sources of Stress Scale (See Appendix G) and the Parental Stress Scale (See Appendix H). A detailed

description of these measures is provided below. At the conclusion of the interview NE caregivers were thanked for their time and permitted to leave.

2.4 Measures

2.4.1 Measure of adaptive behaviour: Behaviour Assessment System for Children - Second Edition (BASC-2).

The BASC-2 (Reynolds & Kamphaus, 2004) is a multi-method, multidimensional system used in the evaluation of behaviour and perceptions of children through to young adults from the ages of 2 to 25 years of age. The BASC-2 assesses a wide range of dimensions, including evaluation of personality and behavioural problems and emotional disturbance, as well as identifying positive, adaptive attributes that can be used in the assessment of treatment.When completing this measure the caregiver is asked to rate the frequency of the child's behaviour from N (never), S (sometimes), O (often) and A (almost always).

This system is multi-method as it contains both a Teacher Rating Scale (TRS) and a Parent Rating Scale (PRS). There are three different forms of the PRS, the PRS-P for preschool children aged 2-5, the PRS-C for children aged 6-11 and the PRS-A for adolescents aged 12-25. The TRS also has three different forms divided by the same age ranges. The current study will be using the child form. The PRS-C consists of 160 items in total; the current study will be focussing on the adaptive skills composite scale made up of 5 subscales. The TRS-C consists of 139 items in total, and contains an Adaptive Skills Composite Scale also consisting of 5 subscales. The current study will only be using the PRS-C to assess for deficits in adaptive behaviour in home and community settings due to time constraints

Adaptive scales included on the TRS and PRS measure positive behaviours including Activities of Daily Living (PRS only; skills required to perform everyday tasks safely and appropriately), Functional Communication (the ability to express ideas and communicate in a

way that is easily understood by others), Social Skills (interpersonal aspects of social adaptation necessary for interacting with others in the home, school and community settings), Leadership (skills associated with successfully fulfilling goals in academic, social and community settings), Adaptability (child's ability to adapt to changes in the environment including changes in routine, changes in teacher as well as shifting from one task to another), and Study Skills (TRS only; school adaptation such as skills relevant to academic performance, achievement motivation, organizational skills and appropriate study habits).

The Adaptive Skills composite score encompassing all of these scales summarizes appropriate daily living skills both inside and outside the home, communication skills, emotional expression and control, pro-social, organizational, study and other adaptive skills. These skills are indicative of appropriate core characteristics required for adaptive behaviour at home, school, and the community and with other individuals. A lack of these skills can also be indicative of poor outcomes and the presence of autism spectrum disorders or an intellectual disability.

Scoring the Adaptive Skills Composite Score and subscales places the child into five categories: Very High, High, Average, At-Risk and Clinically Significant. A score of 70 and above places the child in the very high range, whilst a score of high is between 60 -69. An average score of 41-59 will encompass two-thirds of the population. A score of between 31-40 places the child at-risk and one to two standard deviations below average. This may indicate the presence of significant problems. A score of below 30 places the child into the clinically significant range indicating an absence of adaptive behaviour placing the child two standard deviations below the average score.

The validity and the reliability of the BASC-2 have been thoroughly discussed with psychometric properties well established for the PRS-C and TRS-C composites. The adaptive skills composite has high internal consistency (PRS: .95; TRS: .97), high test-retest reliability

(PRS: .90; TRS: .89), and moderate inter-rater reliability (PRS: .77; TRS: .61) with both the PRS and TRS resulting in a comprehensive assessment tool for adaptive behaviour (Reynolds & Kamphaus, 2004; Tan, 2007). Reliabilities of the individual scales have also been reported with high internal consistency (PRS: .83; TRS: .90); high test-retest reliability (PRS: .83; TRS: .86), and moderate inter-rater reliability (PRS: .73; TRS: .52) (Reynolds & Kamphaus., 2004).

2.4.2 Measure of stress: The Parental Stress Scale (PSS). The Parental Stress Scale (Berry & Jones., 1995) is a brief, valid and reliable measure of the construct of parental stress, and can serve as an adequate replacement for the Parenting Stress Index (Abidin, 1990). This scale is self-report and easy to administer. Scores range from 1 (strongly disagree) to 5 (strongly agree) with 18 items in the scale, with a total sum of scores ranging between18 to 90. Higher scores indicate a higher level of stress.

Support for internal reliability (0.83) and test-retest reliability (0.81) and validity for mothers, fathers as well as respondents representing different family constellations. It is appropriate for both parents of children with and without clinical problems. The PSS needs more support in research for single parents. While the scale can have a minimum score of 19 and a maximum score of 90, the authors have not indicated any cut-off points, like Rubin (2013) the scale will be broken down into three sections for low, moderate and high levels of stress.

2.4.3 Measure of stress: Sources of Stress. This is a 10 item scale looking at potential stressors in parent's lives. The first 9 questions are measured on a 3 point scale with the stressor either being no problem (0), some problem (1) or a major problem (2). The last question of the scale invites the participant to report whether there are additional stressors in

their life not reported by the scale and will then be ranked accordingly. Scores can range from 0 to 20 with higher scores indicate more stressful problems. This scale has previously been employed in the Christchurch Health and Development Study. This scale will be broken down into two groups of high and low stress.

2.4.4 Measure of socio-economic status: Elley & Irving. The revised Elley-Irving Socio-Economic Index (Elley & Irving., 2003) was used to assess family SES. Family SES was grouped into three categories. Caregivers were classed as low SES if they were unemployed, were a stay at home caregiver or working unskilled or semi-skilled jobs. Caregivers were categorised as having a moderate SES if they were employed in either skilled or technical jobs. High SES was assigned to caregivers who held either managerial or professional jobs. The highest SES of each partner, if applicable, was assigned as the total family SES.

2.5 Data Entry and Planned Data Analyses

Data were analysed using SPSS Statistics 22. Firstly, basic descriptive statistics were carried out for each group using independent samples t-tests for continuous variables, or for dichotomised variables, the chi-square statistic.

Secondly, to examine the difference between ME children and NE children on their adaptive behaviour skills, a between-groups comparison was carried out using an independent samples t-test. This was carried out for the overall adaptive behaviour outcomes as well as each individual subscale to determine significant differences between the groups. The effect sizes of the differences between these two groups were determined using Cohen's *d*. Thirdly, adaptive differences were then investigated across caregiver type in the ME groups using a

two-way analysis of variance. This was conducted to determine whether there was a significant difference in child adaptive behaviour in relation to caregiver type.

Fourthly, to compare the stress levels of caregivers of ME and NE children across both parenting stress and general everyday stress, another between-groups comparison was carried out using an independent samples t-test. Effects sizes were again determined using Cohen's *d*. Fifth, chi-square tests were conducted to determine across which specific areas of general stress significant differences existed in regards to whether stress was experienced or not.

Sixth, a Pearson's product moment correlation was completed to determine whether there was a relationship between child adaptive behaviour outcomes and caregiver stress scores for both parenting and general stress. Lastly, an analysis of covariance was conducted to investigate independent contributions of adaptive behaviour, family SES and methadone-exposure to overall general everyday caregiver stress. This analysis was conducted to investigate which variables were the strongest predictors of caregiver stress.

3 Results

3.1 Characteristics of the Participants

3.1.1 Child and family characteristics. The characteristics and demographic information pertaining to the child participants and their families in the current study are shown in Table 4. There was similar numbers of males in both the NE (34.6%) and ME (42.9%) groups resulting in no difference in sex between the groups (p = .54). Similarly children in both groups were comparable in age (ME group (M = 9.56, SD = 0.38); NE group (M = 9.68, SD = 0.55), p = .37). Both groups were also similar in ethnicity with no differences in the number of NZ/European, NZ Maori or other minorities (p = .82).

3.1.2 Child living arrangement. As show in Table 4 children born to mothers maintained on methadone were less likely to be with their biological mothers at 9/10 years of age with only half doing so in comparison to all (100%) of the comparison NE children (p = .001). Further, nearly a fifth (17.9%) of ME children were living with another relative, another 17.9% living with a non-relative and the remaining 14.3% were living with only their biological fathers.

3.1.3 Marital status of caregiver. As shown in Table 4 caregivers of children prenatally exposed to methadone are more likely to be single parents (57.2%) while caregivers of children not exposed to methadone were more likely to be married (57.7%) (p = .02). Although not all ME children were living with their biological mothers, there was no significant difference in terms of how many other dependent children were living in their place of residence (p = .26).

3.1.4 Family socio-economic status. Basic demographic information including SES as assessed by the Elley Irving scales for the New Zealand population (Elley & Irving., 2003), and marital status are shown in Table 4. With respect to family SES nearly two thirds (60.7%) of the ME children were in families representative of low SES described as unskilled or unemployed in comparison with less than one third (26.9%) of the NE caregivers, while almost half (42.3%) of NE caregivers were more likely to be representative of high/ professional SES, while no ME caregivers were placed within this bracket ($p < .001$).

Table 4

Family Characteristics of all Children and Caregivers

Measure	Non- Exposed (n=26)	Methadone-Exposed (n=28)	t / χ^2	*p*
Child Characteristics				
Male	34.6 (9)	42.9 (12)	.78	.54
Age (years), M ± SD	9.68 (0.55)	9.56 (0.38)	-.91	.37
Ethnicity				
NZ/European	84.6 (22)	78.6 (22)		
NZ Maori	11.5 (3)	14.3 (4)		
Other European	4.5 (1)	7.1 (2)	.40	.82
Child Living Arrangement				
With biological mothers	100 (26)	50 (14)		
With biological fathers only	0	14.3 (4)		
With other relative	0	17.9 (5)		
Children with non-relative	0	17.9 (5)	17.55	.001
Marital Status of Caregiver				
Married	57.7 (15)	21.4 (6)		
Cohabitating	7.7 (2)	21.4 (6)		
Single Parent	34.6 (9)	57.2 (16)	8.86	.02
Family Socio-Economic Status				
Professional	42.3 (11)	0		
Skilled	30.8 (8)	39.3 (11)		
Unskilled/ Unemployed	26.9 (7)	60.7 (17)	15.59	< .001

Note. Two tailed tests were used for all statistical evaluations. Data presented as % (N) unless otherwise specified.

3.2 Adaptive Behaviour Outcomes of Methadone-Exposed and Non-Exposed Comparison Children

3.2.1 Hypothesis one: Methadone-exposed children will have significantly lower adaptive behaviour outcomes than non-exposed comparison children.

Table 5 shows the mean adaptive behaviour scores for all study children on the BASC-2 for the Adaptive Skills Composite and for the five subscales: Activities of Daily Living, Adaptability, Functional Communication Leadership Skills, and Social Skills for the ME and NE groups. Both ME children and NE children achieved scores in the average range for the Adaptive Skills Composite as well as in all subscales indicating no deficit in adaptive behaviour. While these scores are within the average range the results reveal clear significant differences between the groups with mean differences and effect sizes also shown in Table 5. These results are in support of hypothesis one in which ME children were hypothesised to have significantly lower scores than NE children on adaptive behaviour outcomes

According to caregiver report, ME children achieved lower mean scores on all Adaptive Behaviour Subscales compared with the NE group with moderate to large effects sizes as shown in Table 5. The Activities of Daily Living subscale is shown to have the largest mean difference in scores between the two groups (mean difference = 9.20). A large effect size as measured by Cohen's d indicates a large magnitude of difference between the two groups on their daily living skills (95% CI [4.6, 13.8], d = 1.10). That is, the NE group children are more likely to have better functional Daily Living Skills than ME children (p < .001), whose mean score (M = 41.04; SD = 8.60) was almost in the At-Risk range (M < 41, BASC-2). The mean difference between the ME group and NE group for the subscale Adaptability was the smallest of the five subscales with a moderate effect size evident between the two groups indicating a moderate magnitude of difference with NE children significantly better at adapting to new situations than ME children (mean difference = 5.05; p

= .05; 95% CI [.06, 10.0], *d* = 0.56). NE children were also more likely to have significantly higher expressive, receptive and written communication skills, as shown by the subscale Functional Communication, than ME children with a large effect size indicating a large magnitude of difference between the groups with a mean difference of 7.91(*p* = .001; 95% CI [3.4, 12.4], *d* = 0.96). The mean difference between the NE group and the ME group on the subscale Leadership Skills was 5.75 with a moderate effect size and magnitude of difference between the groups with NE children more likely to have great Leaderships Skills than ME children (*p* = .01; 95% CI [1.4, 10.1], *d* = 0.72). The largest effect size was evident for the subscale Social Skills indicating the greatest magnitude of difference between the two groups with NE children rated as significantly more likely to have better social skills than ME children (mean difference = 8.01; *p*< .001, 95% CI [4.5, 11.5], *d* = 1.24). The highest mean score for both NE children and ME children was observed for this subscale (M = 54.65, SD = 7.09, M = 46.64, SD = 5.80 respectively). A similarly large effect size was evident for the overall Adaptive Skills Composite score with NE children more likely to have greater adaptive skills than ME children (mean difference = 7.25; *p* < .001; 95% CI [4.0, 10.5], *d* = 1.21). A post hoc power analysis was carried out using GPower (Faul, Erdfelder, Buchner & Lang, 2009) with power (1- β) set at 0.80, an effect size at 0.80 and α = .05 two-tailed. This showed that the entire sample size of 54 was sufficient to reach statistical significance.

Table 5

Comparison of Adaptive Behaviour Scores of Non-Exposed Children and Methadone-Exposed Children

Measure	Non-Exposed (n=26) M (SD)	Methadone-Exposed (n=28) M (SD)	*t*	*p*	*d*	Mean Group Difference [95% C.I.]
Adaptive Skills Composite Score	51.96 (6.41)	44.71 (5.54)	4.46	<.001	1.21	7.25 [4.0 - 10.5]
Activities of Daily Living	50.23 (8.18)	41.04 (8.60)	4.02	<.001	1.10	9.20 [4.6 - 13.8]
Adaptability	51.19 (7.95)	46.14 (10.12)	2.03	.05	0.56	5.05 [.06 - 10.0]
Functional Communication	51.69 (8.01)	43.79 (8.43)	3.53	.001	0.96	7.91 [3.4 - 12.4]
Leadership Skills	52.08 (8.96)	46.32 (6.99)	2.64	.01	0.72	5.75 [1.4 - 10.1]
Social Skills	54.65 (7.09)	46.64 (5.80)	4.56	<.001	1.24	8.01 [4.5 - 11.5]

3.2.2 Classification of adaptive behaviour: comparison of methadone-exposed and non-exposed adaptive scores. As shown in Table 6, are the proportion of ME and NE children who were classified into a High, Average, At-Risk, or Clinically Significant adaptive behaviour category (see method). The majority of children in both groups scored within the average range on all subscales as well as the overall Adaptive Skills Composite score. Within the Adaptive Skills Composite score just under a fifth (19.2%) of children in the NE group scored within the High range, whilst in comparison no children in the ME group scored within the High range. The largest numbers of the NE and ME groups (80.8% and 85.7% respectively) scored within the Average range for the composite score. No children in the NE group scored lower than average whilst only 14.3% of ME children scored in the At-Risk range with no children scoring in the Clinically Significant range.

Almost a fifth (19.2%) of NE children scored within the High range for the Activities of Daily Living subscale compared to 1 child in the ME group. Almost a tenth (7.1%) of children scored within the Clinically Significant range for this subscale with almost half (46.4%) scoring within the At-Risk range.

Within the subscale Adaptability a similar number of ME children and NE children achieved scores in the High range (3 (10.7%) and 4 (15.4%) respectively). A quarter (25.0%) of ME children achieved scores placing them in the At-Risk range compared to a tenth (11.5%) of NE group children. A small percentage of ME children (7.1%) were classified in the Clinically Significant range while no children in the NE group did so.

For the subscale Functional Communication a large number (23.1%) of children within the NE group were scored within the High range, whilst no ME children scored in the High range within this subscale. A fifth (21.4%) of ME children were placed in the At-Risk range compared to 11.5% of NE children, and whilst 7.1% of the ME group achieved a score in the Clinically Significant range, none of the NE children achieved scores in this range.

Almost a fifth (23.1%) of NE children scored in the High range on the subscale Leadership Skills, in comparison no children in the ME group scored in this range. A quarter (25%) of ME children scored in the At-Risk range in comparison to only 2 (7.7%) children in the NE group. Only one ME group child (3.6%) scored in the Clinically Significant range within this subscale.

Caregivers rated NE children as having greater Social Skills with the greatest number of children scoring within the High range within this subscale than in all of the other subscales. Only one child (3.6%) in the ME group scored in the High range. The largest majority of children in the ME group scored within the Average range in comparison to all of the other subscales. The smallest number of children in both the NE and ME groups scored in the At-Risk range (3.8% and 10.7% respectively) with no children in either group scoring in the Clinically Significant range.

As can be seen in Table 4 there is a wide range of scores indicating that a larger percentage of NE children have scores within the High range on the BASC-2 whilst ME children do not. Caregivers of ME children have rated a higher percentage of these children within both the At-Risk and Clinically Significant range in comparison to NE children. This is in contrast to no NE children scoring within the Clinically Significant range across all of the subscales and the Adaptive Skills Composite.

Table 6

Classification of Adaptive Behaviour Scores of all Study Children

	High		Average		At-Risk		Clinically Significant	
Measure	NE	ME	NE	ME	NE	ME	NE	ME
Adaptive Skills Composite	19.2 (5)	0	80.8 (21)	85.7 (24)	0	14.3 (4)	0	0
Activities of Daily Living	19.2 (5)	3.6 (1)	69.2 (18)	42.9 (12)	11.5 (3)	46.4 (13)	0	7.1 (2)
Adaptability	15.4 (4)	10.7 (3)	73.1 (19)	57.1 (16)	11.5 (3)	25.0 (7)	0	7.1 (2)
Functional Communication	23.1 (6)	0	65.4 (17)	71.4 (20)	11.5 (3)	21.4 (6)	0	7.1 (2)
Leadership Skills	23.1 (6)	0	69.2 (18)	71.4 (20)	7.7 (2)	25.0 (7)	0	3.6 (1)
Social Skills	26.9 (7)	3.6 (1)	69.2 (18)	85.7 (24)	3.8 (1)	10.7 (3)	0	0

Note. High scores range from 60 – 69, Average scores range from 41 – 59, At-Risk scores range from 31 – 40 and Clinically Significant scores are <30. Data presented as % (N) unless otherwise specified.

3.2.3 Adaptive behaviour outcomes of methadone-exposed children in relation to caregiver arrangement. Analysis has revealed the distinct differences in adaptive behaviour scores of both ME children and NE comparison children. Table 7 displays the adaptive behaviour scores for ME children in relation to their caregiver arrangement, and shows that half (n=14) of the ME group children do not live with their biological mothers. Given the small sample sizes of these groups, this is an exploratory analysis. As shown in Table 7 there are no statistically significant differences between the groups on the Adaptive Skills Composite, or any of the adaptive behaviour subscales when broken down into caregiver arrangements ($p > .05$).

Table 7

Comparison of Adaptive Behaviour Outcomes of Methadone-Exposed Children in Relation to Caregiver Arrangement

Measure	Biological Mother (n=14) M (SD)	Biological Father (n=4) M (SD)	Other Relative (n=5) M (SD)	Non-Relative (n=5) M (SD)	*F*	*p*
Adaptive Scale Composite Score	45.21 (5.73)	45.00 (2.94)	45.40 (3.91)	42.40 (8.39)	0.33	.80
Activities of Daily Living	42.00 (8.92)	37.25 (4.65)	39.80 (4.97)	42.60 (13.32)	0.38	.77
Adaptability	46.57 (8.62)	52.75 (3.69)	47.60 (11.04)	38.20 (10.12)	1.78	.18
Functional Communication	44.93 (7.76)	41.25 (4.27)	43.60 (3.78)	42.80 (15.63)	0.21	.89
Leadership Skills	46.29 (7.30)	46.50 (5.69)	47.40 (2.30)	45.20 (11.15)	0.08	.97
Social Skills	46.64 (4.53)	47.50 (6.40)	49.00 (7.42)	43.60 (3.33)	0.74	.54

3.3 Stress Reported by Caregivers of Methadone-Exposed and Non-Exposed Children

3.3.1 Hypothesis two: Caregivers of methadone-exposed children will experience significantly more parenting stress and general stress in comparison to caregivers of non-exposed children.

Table 8 shows both stress surrounding being a caregiver and also stress in everyday life. These results only partially support hypothesis two indicating that there is not a significant difference in parenting stress between the caregivers, but there is significant differences in general stress between caregivers of ME and NE children. With respect to general stress (as measured by the Sources of Stress Scale), a significant difference was reported between caregivers of NE children and ME children (p = .03, 95% CI [.14, 3.09], d = .61). Stress levels were also relatively low for both groups with a mean score of 5.0 for caregivers of ME children and a mean score of 3.4 for caregivers of NE children. General stress scores between caregivers reveals a moderate effect size with a 0.6 difference in standard deviations between the two groups and a mean difference in scores of 0.7.

There were no differences in reported parenting stress in the caregiving process between the two groups of caregivers as shown by a minimal mean difference in scores of 0.9 and a very small magnitude of difference (p = .65, 95% CI [-3.12, 5.00], d = 0.13). Parenting stress levels were relatively low for both caregivers of ME children and caregivers of NE children with mean scores of 36.6 and 35.7 respectively.

These results suggest that caregivers of children prenatally exposed to methadone were more likely to report greater stress in general everyday life than caregivers of children not exposed to methadone whilst they were not more likely to report greater stress in the caregiving process.

Table 8

Comparison of General Stress and Parenting Stress of Caregivers of Non-Exposed Children and Caregivers of Methadone-Exposed Children

	Non-Exposed (n=26)	Methadone-Exposed (n=27)				
Measure	M (SD)	M (SD)	*t*	*p*	*d*	Mean Group Differences [95% C.I.]
General Stress	3.38 (2.00)	5.00 (3.21)	2.19	.03	0.61	0.73 [.14 – 3.09]
Parenting Stress	35.69 (7.66)	36.63(7.06)	0.46	.65	0.13	0.94 [-3.12 – 5.00]

3.3.2 Specific general stress outcomes in caregivers of non-exposed and methadone-exposed children. On further analysis the different areas of general stress were investigated to ascertain where the differences existed between the two groups of caregivers as shown in Table 9. When looking at the specific stressors of the caregivers within this study only two stressors were significantly different. Having another adult to talk to was reported as a problem by 15.4% of NE caregivers in comparison to 40.7% of ME caregivers, this difference was statistically significant with ME caregivers more likely to report not having another adult to talk to as a problem (p = .04). Caregivers of ME children were also more likely to report not having anyone they could call on for assistance with children as a problem in comparison to NE caregivers (NE = 19.2%, ME = 44.4%, p = .05).

The stressors regarding not having enough money for their family's needs, not having enough time to themselves and getting enough sleep are of interest as ME caregivers reported the greatest levels of stress, however there was no significant differences between ME and NE caregivers. When looking at the stressor regarding having enough money for their family's needs, the majority of caregivers in each group (NE = 53.8% and ME = 63.0%) experienced some reported level of stress, however there was no significant differences between the groups (p = .50). The greatest number of ME caregivers experienced not having enough money as a stressor. This trend continued where the majority of caregivers in both groups (NE = 73.1% and ME = 55.6%) experienced stress regarding having enough time to themselves, again there was no significant difference between the two groups (p = .18). Getting enough sleep was also regarded as one of the greatest stressors by ME caregivers with 63.0% reporting this as stressful in comparison to just under half (46.2%) of NE caregivers.

The remaining stressors reported by ME caregivers within this study were relatively low. Half of the caregivers of NE children experienced some level of stress regarding having

enough time to spend with their partners in comparison to just under 30% of ME caregivers. This difference was not significant (p = .13). Regarding transport difficulty, only 15% of NE caregivers reported this as a stressor in comparison to 33% of ME caregivers with the majority in both groups experiencing no difficulties with transport (p = .13). The majority of caregivers in both groups also do not regard inadequate accommodation as a problem in their lives with the smallest number of caregivers in each group reporting this as some problem (NE = 2, ME = 4, p = .41). Not being able to get out of the house was reported as a problem by only 15.4% of NE caregivers and 33.3% of ME caregivers, with the majority reporting this as no problem (p = .13). Similarly there were no significant differences between the two groups with reporting on additional stressors with 11.5% of NE caregivers and 29.6% of ME caregivers reporting any additional stressors.

Table 9

Comparison of Specific General Stress Outcomes in Caregivers of Non-Exposed Children and Caregivers of Methadone-Exposed Children

	Not Stressful		Stressful			
Measure	NE	ME	NE	ME	χ^2	*p*
Not enough money for family's needs	46.2 (12)	37.0 (10)	53.8 (14)	63.0 (17)	0.45	.50
Not enough time to self	26.9 (7)	44.4 (12)	73.1 (19)	55.6 (15)	1.77	.18
Not enough time with partner	50 (13)	70.4 (19)	50 (13)	29.6 (8)	2.30	.13
Transport difficulties	84.6 (22)	66.7 (18)	15.4 (4)	33.3 (9)	2.31	.13
Inadequate accommodation	92.3 (24)	85.2 (23)	7.7 (2)	14.8 (4)	0.70	.41
Not enough sleep	53.8 (14)	37.0 (10)	46.2 (12)	63.0 (17)	1.51	.22
Not able to get out of house	84.6 (22)	66.7 (18)	15.4 (4)	33.3 (9)	2.31	.13
No other adult to talk to	84.6 (22)	59.3 (16)	15.4 (4)	40.7 (11)	4.20	.04
No one to call on for assistance with children	80.8 (21)	48.1 (13)	19.2 (5)	44.4 (12)	3.87	.05
Other	88.5 (23)	70.4 (19)	11.5 (3)	29.6 (8)	2.64	.10

Note. Data presented as % (N) unless otherwise specified.

3.4 Relationship between Caregiver Stress and Child Adaptive Behaviour

3.4.1 Hypothesis three: Greater deficits in child adaptive behaviour will be negatively correlated with both general and parenting stress.

The following results were somewhat in support of the third hypothesis with a negative correlation shown between general stress and adaptability in the ME group as shown in Table 10. However the results also show no significant correlations between any other adaptive behaviour outcomes, or a significant relationship between parenting stress and adaptive behaviour outcomes. As shown in Table 10 there was a medium negative correlation between Adaptability and general stress r = -.46, p = .01, indicating as the child's adaptability decreases, the caregivers general everyday stress levels increase. Caregiver stress was not significantly related to general stress in the ME sample r = .30, p = .12. No other relationships reached significance between parenting stress and adaptive behaviour or any other adaptive behaviour subscales and general stress. These results suggest that there is a relationship between ME children's adaptability and their caregiver's reported levels of general stress.

Table 10

Correlations between parenting stress, general stress, child adaptive behaviour composite and adaptive behaviour subscales for the methadone-exposed sample at 9/10 years

		1	2	3	4	5	6	7	8
1	Parenting Stress								
2	General Stress	.30							
3	Activities of Daily Living	.03	.09						
4	Adaptability	-.29	-.46*	.04					
5	Functional Communication	.26	.07	.09	.75**				
6	Leadership Skills	.24	.08	.03	.63**	.71**			
7	Social Skills	-.03	.06	.22	.54**	.39*	.42*		
8	Adaptive Skills Composite	.04	-.09	.46*	.82**	.83*	.76**	.67**	

*. Correlation is significant at the 0.05 level (2-tailed)
**. Correlation is significant at the 0.01 level (2-tailed)

Correlations in the NE groups have been recorded in Table 11 below. These results also partially support hypothesis three with significant correlations between general stress and the adaptive behaviour subscales Activities of Daily Living, Functional Communication and the overall Adaptive Skills Composite score, however there is significant relationship between parenting stress and any of the adaptive behaviour outcomes. There was a medium positive correlation between the two variables parenting stress and general stress r = .41, *p* = .04. In other words as reported parenting stress increases reported general everyday stress increases or vice versa. These results suggest that in the comparison group there is a

relationship between general stress and parenting stress whilst this relationship was not found in the ME caregiver group. In terms of the adaptive skills of the children and the relationship with stress, general stress is moderately negatively correlated with Activities of Daily Living $r = -.41$, $p = .04$ and highly negatively correlated with Functional Communication $r = -.59$, $p = .02$. These results show as the child's daily living skills and expressive, receptive and written skills decreases the caregivers reported general stress increases. General stress is further moderately negatively correlated with the adaptive skills composite $r = -.46$, $p = .02$, in other words as the overall adaptive behaviour of the child decreases the reported everyday stress of the caregiver increases. Unlike the ME group, the relationship between adaptability and general stress did not reach significance in the comparison group $r = -.25$, $p = .21$. Adaptive behaviour has no significant relationship with parenting stress much like the ME group. General stress on the other hand is significantly related to both children's reported activities of daily living skills, and functional communication as well as their overall adaptive skills composite score.

Table 11

Correlations between parenting stress, general stress, child adaptive behaviour composite and adaptive behaviour subscales for the comparison sample at 9/10 years

		1	2	3	4	5	6	7	8
1	Parenting Stress								
2	General Stress	.41*							
3	Activities of Daily Living	-.33	-.41*						
4	Adaptability	-.16	-.25	.58**					
5	Functional Communication	-.09	-.59**	.48*	.58**				
6	Leadership Skills	-.17	-.36	.54**	.62**	.77**			
7	Social Skills	-.20	-.13	.44*	.32	.41*	.45*		
8	Adaptive Skills Composite	-.24	-.46*	.77**	.79**	.84**	.88**	.64**	

*. Correlation is significant at the 0.05 level (2-tailed)
**. Correlation is significant at the 0.01 level (2-tailed)

3.4.2 Influence of adaptive behaviour on general stress in caregivers. A 2 by 2 between-groups analysis of covariance was conducted to further assess the relationship between child adaptive behaviour and general stress whilst controlling for family SES and child prenatal methadone exposure (group status). Adaptive behaviour was assessed using the overall Adaptive Behaviour Composite. Parenting stress was not further assessed due to non-significant findings regarding a correlational relationship. As shown in Table 12 no significant relationship between child adaptive behaviour and caregiver stress remained which does not support the third hypothesis. Neither of the main effects were significant,

group: F (1, 48) = .33, p= .57; SES: F (2, 48) = 1.04, p= .36. An interaction effect between group and SES was also not significant (F (1, 48) = .37, p = .55). The overall Adaptive Skills Composite scores of the children were also not significant with adaptive behaviour explaining only 3.5% of the variance in caregiver general stress (F (1, 48) = 1.73, p = .20). These results suggest that there is no relationship between general stress and adaptive behaviour, prenatal methadone exposure or family SES ranking.

Table 12

Summary of Analysis of Covariance: Predictors of Caregiver General Stress

Measure	*F*	*p*	Partial Eta Squared
Adaptive Skills Composite	1.73	.20	.035
Group	0.33	.57	.007
SES	1.04	.36	.042
Group x SES Interaction	0.37	.55	.008

The above results reveal that child adaptive behaviour scores do not account for a significant amount of variance in general stress as reported by their caregivers. These results are not in support of the third hypothesis. These findings indicate that future research is required to investigate other environmental factors not considered by this study that may better contribute to reported general stress in caregivers.

4 Discussion

The current study has provided the first evidence of adaptive behaviour outcomes in older-middle school aged children prenatally exposed to methadone. The research findings indicate that these children's performance in everyday life and their ability to navigate their environment. Previous research has been limited, producing mixed findings with additional methodological issues such as the investigation of a limited range of adaptive behaviour outcomes. The current study has also provided further information regarding the daily hassles and parenting stress of caregivers of ME children providing further insights into this unique population. The association between child adaptive behaviour and caregiver stress was ultimately explored in this population.

The current study had three specific aims. The first aim was to assess whether the levels of adaptive behaviour skills of children born to mothers maintained on methadone were significantly different to NE comparison children. Second, the study aimed to assess whether the caregivers of these children experienced different levels of stress, both in the parenting process and in everyday life. Finally, the current study investigated whether there was a relationship between the adaptive behaviour skills of the child and the stress levels of the caregiver. The overall findings from this study were that children's adaptive behaviour was not related to caregiver stress. Findings relating to each of the study's aims will be discussed below.

4.1 Adaptive Behaviour Outcomes of Methadone-Exposed and Non-Exposed Comparison Children

Caregivers of ME children reported significantly lower levels of adaptive behaviour outcomes on both the overall Adaptive Skills Composite and the five adaptive behaviour subscales (Adaptability, Activities of Daily Living, Functional Communication, Leadership

Skills and Social Skills) than did caregivers of NE children, supporting the first hypothesis. These findings indicate that ME children were less likely to be regarded by their caregivers as having the skills required to perform everyday activities safely, adapt to changes in the environment, express ideas and communicate effectively, successfully fulfil goals in academic, social and community settings as well as interact with age-appropriate peers in these settings. These findings support past research in which ME children evidence greater difficulties in their expressive language and verbal comprehension skills (functional communication), as well as peer relationship difficulties and social competence across a range of ages (Hunt et al., 2008; Sarfi et al., 2013; Soepatmi, 1994). Previous findings also evidence greater themes of difficulties in using outside help in overcoming problems (less reliance on others), and the ability to give appropriate assistance to others (less supportive of others [functional communication and leadership skills]) (de Cubas and Field, 1993) which is consistent with the current study's findings.

In contradiction to the current study's findings was research conducted by Bada et al. (2008) and de Cubas and Field (1994) who found no significant differences between adaptive behaviour outcomes in children prenatally exposed to cocaine and/or opiates and methadone respectively in comparison to NE children. Bada et al. further reported that child adaptive behaviour outcomes at age 3 years were significantly related to child caregiver arrangement. Children living in non-relative care had reduced daily living skills in comparison to those children living with their biological parents.

A direct comparison between the current study's findings and those of the previous studies is difficult for a number of reasons. In Bada et al's. (2008) study, study children were much younger at only 3 years of age in comparison to the 9/10 year olds in the current study. There are also further complications in terms of the measures used within each study, as Bada et al. has used the VABS to investigate adaptive behaviour outcomes, whilst de Cubas and

Field (1994) has employed the use of the Roberts Apperception Test for Children Adaptive Skills Subtest in comparison to the BASC-2 ASC used in the current study. Lastly, the extent of prenatal drug exposure across the current study and Bada et al's study is not comparable. In Bada et al's study the majority of children were prenatally exposed to cocaine, with only a number of children prenatally exposed to opiates, as well as a further sample of children exposed to both drugs.

Although the current study's findings evidence significantly less adaptive behaviour skills in ME children, scores reported by caregivers indicated these children possessed adaptive behaviour skills regarded as average. Upon further analysis, the differences between ME children and NE children were apparent in the individual classification of adaptive behaviour skills into groups e.g.: average, at-risk. A number of ME children were reported as possessing adaptive behaviour skills below those (<41) attributed to two-thirds of population, particularly in the assessment of the performance of everyday activities in a safe manner (Activities of Daily Living). Analysis further revealed a small number of ME children who achieved scores within the clinically significant range, two standard deviations below those skills assessed to be average in the standard population indicating a lack of these adaptive skills. Whilst the findings indicate the majority of ME children have acquired age-appropriate adaptive behaviour skills, there are still a number of ME children lacking core characteristics of these skills particularly required in activities of daily living. This is of particular interest particularly as Reynolds and Kamphaus (2004) describe that a lack of adaptive behaviour may be indicative of poor outcomes, the potential presence of autism spectrum disorders, or an intellectual disability.

Further investigation of this outcome using the "double jeopardy" model may suggest that whilst these children have been prenatally exposed to methadone, for half of these children their environment will have changed with their placement in other relative or non-

relative care (Lester, 1998). This may lead to improvements in the child's nutrition as well as socio-economic standing which may lead to improvements in their adaptive behaviour. However there may conversely be additional stressors associated with caregiver instability (Lean, 2012). This would suggest that child adaptive behaviour may be attributable to caregiver arrangement in the ME group as reported by Bada et al. (2008), where children in non-relative care were reported to experience a decrease in adaptive behaviour overall, and specifically in the areas of functional communication and activities of daily living. Lean (2012) further suggests poorer outcomes for children in regards to internalising disorders in relation to multiple caregiver placements. Due to an insufficient sample size within the current study, this resulted in a lack of power to investigate caregiver arrangement further. These differences may further be attributed to caregiver factors not assessed within the current study such as maternal distress as shown by Sarfi et al. (2013) which can contribute to child functioning as described by the "double jeopardy" model as well (Lester, 1998). Additional assessment of adaptive behaviour skills within an academic setting would also provide valuable information regarding the direct functioning of these children within a separate environment.

In summary these findings suggest that the gap in adaptive behaviour skills between ME children and NE children may be closing. However a number of ME children are at a deficit in their acquisition of these important life skills that serve as a risk factor for later outcomes. Differences between ME children who have achieved adaptive behaviour skills and those who have not may be attributable to potential variables not assessed within the current study such as caregiver arrangement and other caregiver factors, as well as additional measurement of adaptive behaviour across other settings, for example, in school and community settings. Investigation of the potential differences between ME children who have sufficiently achieved these adaptive behaviour skills and those who have not, will

provide a much clearer picture as to the impact on these children's adaptive behaviour and their ability to function within the wider community.

4.2 Parenting Stress and General Stress Outcomes of Caregivers of Methadone-exposed and Non-Exposed Children

The next focus of the current study was to assess whether there were any difference in parenting stress and general stress between the caregivers of both ME children and NE comparison children. Caregivers of ME children were more likely to report higher levels of general everyday stress, but not parenting stress compared to caregivers of NE children. This finding lends some support to the second hypothesis. Findings relating to both of these measures of stress will be discussed below.

4.2.1 General stress. Whilst ME caregivers reported higher levels of overall general stress, both caregiver groups reported relatively low levels of stress. Upon further investigation, these findings revealed that caregivers of ME children reported experiencing greater stress, in comparison to NE caregivers, in two specifics areas: Not having another adult to talk to, and not having someone to call on for assistance with their children. These findings indicate that ME caregivers were experiencing a lack of social support in their day-to-day lives. Caregivers of ME children were more likely to be solo caregivers as well as having a lower SES, potentially playing a role in this increase in stress in these areas. In a study conducted by Hall and Graff (2011), primary caregivers reported their spouse as their most helpful support system. For ME caregivers being primarily solo-caregivers, this would result in a lack of social support within the direct home environment that caregivers of NE children would theoretically receive (Beck et al., 2004). These findings further indicate a potential lack in available resources in order to obtain child assistance. Limited resources

increase the influence of routine stressors faced by caregivers as evidenced by the lower SES of the ME caregivers, and reported stressors related to not having enough money for their families needs (Baum et al., 1999).

Caregivers of ME children were made up of four distinct caregiver types including biological mothers, solo biological fathers, other biological relatives including grandparents, and foster caregivers, each with their own additional stressors which may account for these differences. Biological mothers of these children may experience additional life stressors relating to their previous or continued drug and methadone use, socially isolating them from others, as well as limiting their financial earnings. Kelley (1998) also describes an increase in social isolation in the biological mothers of drug exposed infants in comparison to caregivers of NE infants.

Solo biological fathers may also experience social isolation in regards to their new roles as solo parents. The majority of solo biological fathers of ME children within this study gained sole custody of their children when the child was 4.5 years of age, promoting a change in the caregiver's daily lives. This places these caregivers in a unique role as the primary caregiver, often not fulfilled by fathers placing them under a greater burden than they previously assumed (Tomanik et al., 2004). Fathers also experience stressors differently as evidenced in a number of studies, in comparison to mothers (Davis & Carter, 2008; Hall & Graff, 2011). Further to this, grandparents of ME children are less likely to have a peer network as they have been thrust back into the parenting role, whilst their peers are entering the retirement phase of their lives. This may make it difficult to find others to assist with children, such as friends and family members, as well as creating more of a financial strain on an already limited income. Foster caregivers also experience their own individual stressors that can result in an increase in general everyday stress. Paley et al. (2006) describes an increase in foster caregiver stress in part due to a lack of preparedness of the difficulties in

raising a child prenatally exposed to alcohol. These observations may be further extended to those foster caregivers in the current study caring for children prenatally exposed to methadone.

The findings that caregivers of ME children report greater levels of general everyday stress are in contradiction to Kelley (1992). Kelley found no significant differences in everyday life stress between caregivers of infants who were prenatally exposed to cannabis, heroin and methadone, and the caregivers of infants who were not prenatally exposed to illicit drugs. This may be due to the use of the PSI to measure life stress in comparison to the SS scale used within this study. The PSI life stress scale contains 19 items in which situational characteristics including demographics and life events are discussed. The Sources of Stress scale used within the current study is a 10 item questionnaire measuring only those stressors that are currently present. Differences in the questions asked as well as in the time frame of when the questions apply can cause difficulty in a direct comparison between these findings.

4.2.2 Parenting stress. The second area of stress investigated in this study was the stress associated with the caregiving process. Parenting stress was previously described as the stress associated with the demands of parenting with the available resources in which to do so (Anthony et al., 2015; Deater-Deckard, 1998). Caregivers of ME children were no more likely to experience parenting stress than caregivers of NE children; this is in contradiction to the second hypothesis. In addition to similar levels in parenting stress, both groups of caregivers reported experiencing low levels of stress indicating that they did not perceive parenting their children as stressful.

In contradiction to these findings is Kelley (1992) who reported that caregivers of drug-exposed infants experienced greater parenting stress than caregivers of NE infants. The large age difference between current study 9 year old children and the infants in the Kelley

study makes it difficult to directly compare the two studies findings. Infants are entirely dependent on their caregivers for basic needs such as feeding and dressing with the caregiver consistently in the parenting role. Moreover, drug-exposed infants require more attention, and are described as irritable with poor interactive abilities and increased health problems (Kelley, 1992). The current study children aged between 9 to 10 years however are much more independent in their daily requirements providing the caregivers with respite from this parenting process during the day. It would be of interest to investigate whether a difference in parenting stress would be observed between caregivers of ME children and caregivers of NE children through to the adolescent period. In addition, it would be of interest to determine whether these stress levels would increase or remain low.

In summary, caregivers of ME children reported greater levels of stress in a number of areas including having another adult to talk to and having someone to call on for assistance with children, however ME caregivers did not experience greater levels of parenting stress. These findings were in contradiction to previous findings by Kelley (1992) however there were a number of methodological differences between the current study and Kelley's study. These findings further highlight particular areas of stress faced by caregivers of ME children, and potential areas of further development such as additional services to assist these caregivers with their childcare needs. Further replication of these findings would be beneficial as research within this area is limited.

4.3 Relationship between Caregiver Stress and Child Adaptive Behaviour

The last aim of this study was to assess the relationship between child adaptive behaviour and caregiver stress. This relationship was initially examined by exposure status in the ME and comparison NE group to investigate group differences. Significant negative relationships were found in a number of areas of child adaptive behaviour and caregiver's

general stress in each group lending some support to the third study hypothesis. As parenting stress was not significantly related to child adaptive behaviour in either the ME or NE group this variable was excluded from further analysis. This finding was ultimately in contradiction to the third hypothesis in which it was hypothesised that parenting stress was significantly correlated with child adaptive behaviour. These findings may also be in relation to the low levels of parenting stress reported by caregivers in the ME and NE groups, as well as the average ratings of adaptive behaviours across all study children.

A lack of a significant relationship between parenting stress in biological caregivers and child adaptive behaviour supports previous study findings (Lecavalier et al., 2006, Peters-Scheffer et al., 2000; Sarfi et al., 2013). These studies highlight additional child variables as the most predictive of caregiver stress. These include child externalising behaviour, emotionally reactive and withdrawn behaviour and attention problems. In addition Sarfi et al. (2013) describes a significant relationship between maternal distress and child adaptive behaviour. Further investigation of additional child variables as predictive of parenting stress is required.

The aforementioned findings of the current study, however are in contradiction to the majority of past research in which a significant relationship between parenting stress and child adaptive behaviour was reported (Beck et al., 2004; Paley et al., 2006; Davis & Carter, 2008; Tomanik et al., 2004; Weiss et al., 2003). As previously mentioned this contrast may be in relation to the low levels of parenting stress described by the caregivers in the current study, as well as the average range of child adaptive functioning reported by these caregivers. A small sample of children in the ME group were within the at-risk and clinically significant range; it would be of interest to investigate whether these children's adaptive behaviour deficits would have an impact on caregiver parenting stress. It would also be of interest to investigate these findings in caregivers with greater reported levels of parenting stress to

determine the differences between those with low levels of parenting stress, and those with high levels of parenting stress in relation to their child's adaptive behaviour outcomes.

4.3.1 Relationship between caregiver general stress and adaptive behaviour after covariate adjustment. After controlling for extraneous factors drug exposure and family SES, adaptive behaviour was not significantly related to general stress explaining only 3.5% of the variance. An unexpected finding was that both family SES and group exposure status were also not significantly related to general stress. These findings suggest that other factors may be influencing caregivers' reports of general stress across both groups that are beyond the scope of the current study.

Previous research has elucidated on mechanisms describing how both child and caregiver factors may influence both caregiver general stress and parenting stress. Child behavioural difficulties and high behaviour problems are strongly associated with caregiver stress over and above child adaptive behaviour (Baker et al., 2002; Lecavalier et al., 2006). Baker et al. (2002) reported a bi-directional relationship in which greater parenting stress contributed to greater child behaviour problems as well.

Caregiver mental health status has further influence on caregiver stress such as distress described as both anxious and depressive symptomology (Sarfi et al., 2013). As previously stated, Hall and Graff (2011) reported that maternal distress was predictive of maternal stress over and above child adaptive behaviour. Sarfi et al. (2013) also reported a significant positive correlation between maternal psychological distress, and stress in both the parent-domain and child-domain also over and above child adaptive behaviour.

There are also impacts associated with caregiver status as described by Paley et al. (2006) in which non-biological caregiver's experienced greater stress in comparison to biological caregivers on the child domain of the PSI. Biological caregivers, on the other hand,

were significantly related to stress within the parent domain of the PSI. Due to a lack of power as previously discussed this relationship could not be explored.

Protective factors such as social support and educational achievement provide buffers to stress (Anthony et al., 2005). Asberg, et al. (2008) investigated the effects of both perceived and received social support on caregiver stress. Perceived but not received social support correlated most significantly with stress reported by caregivers indicating that the perception of social support may be of more benefit than the actual social support received. This may be due to the controversy surrounding the differing conceptual perspectives on what defines social support as well as its measurement (Cohen & McKay, 1984). A well validated and reliable measure of perceived and received social support would aid in future research and the study of potential buffers against caregiver stress. Lower educational achievement has also been associated with increases in the stress hormone cortisol whilst higher educational achievement provided a buffer against such cortisol increases (Cohen et al., 2006). Given family SES was not found to predict caregiver general stress, educational achievement may have made more of a significant contribution, however further research is required to investigate this possibility.

Similarly to parenting stress, average adaptive behaviour skills in the study children may also account for a lack of a significant contribution to caregiver general stress. This can also be observed in the "double jeopardy" model by Lester (1998), where there is a mutual feedback of the child to the caregivers. If there are no child difficulties in regards to average adaptive behaviour skills, this would not feedback negatively on the caregiver. It would be of great interest to investigate the stress levels of caregivers with children who are at a deficit in their adaptive behaviour skills. This would also be of interest to investigate in caregivers who experienced a great deal of general everyday stress, as caregivers within this study reported relatively low levels as well.

In summary, the current study has demonstrated there is no significant relationship between child adaptive behaviour, and caregiver parenting stress and general stress. In general, the current study findings fail to support those of previous research. This may be in part due to the reported caregiver stress levels that were relatively low, together with caregiver reported child adaptive behaviour scores that were within the average range. It would be of future interest to investigate whether the relationship between caregiver general and parenting stress and child adaptive behaviour might exist for children at a deficit in their adaptive behaviour skills. It would also be of interest to follow these families to determine whether there could be a possible change in this potential relationship. In addition, it would be of benefit to investigate the potential impact of caregiver stress on child adaptive behaviour as was investigated within Sarfi et al. (2013) and Riley et al. (2009) in a bi-directional relationship. These findings further highlight the potential for future research into the impact of additional variables previously discussed on caregiver stress, as well as the bi-directionality of this possible relationship.

4.4 Implications of the Findings

A number of research implications can be identified from the current study's contributions to the relatively understudied population of ME children. The current study provides a significant contribution to the effects of prenatal methadone exposure on middle school aged children followed since birth, as well as the impact on the child's later adaptive behaviour development. The current study also provides emphasis in regards to specific areas of stress in caregivers of these ME children.

Addition to research of children this age. The ME children within this study have been followed by the CCDRG to the age of 9/10 years with relatively good retention rates. Findings from this thesis present results regarding the adaptive behaviour skills of these older

middle-school aged children that have been relatively understudied as a whole, or in children in this age range suggesting a relatively novel area of research. Previous findings in various areas of adaptive behaviour in these children have suggested a deficit, while the current study's findings still imply a difference in adaptive behaviour between the two groups of children, the ME children are catching up. It is currently unknown under what circumstances these children are gaining these adaptive real world skills. These skills are important for the child as they prepare them for the world around them. Without these skills these children would not be able to function in day to day life as effectively as other children and consequently as they age, other adults. These findings provide valuable information in a relatively unknown area. As the majority of ME children are functioning in the low average range, it is important to differentiate what is different about these children and the few children that have been regarded by their caregivers as 'at-risk' or clinically significantly impaired.

Implications for caregivers. The findings of the current study further reveal significant differences in the reported general everyday stress levels of the caregivers of ME children. In particular, the caregivers of ME children report stress surrounding not having another adult to talk to, and not having someone to call on for assistance with children. These findings raise concerns regarding the support these caregivers may have in these areas specifically. Future research in this area could be extended to determine what social support these caregivers have in place and whether this needs to be improved upon to alleviate some of the stress they may be experiencing in their day-to-day lives in regards to this. Respite care may be helpful to provide these caregivers with a break who cannot afford to pay for this service themselves.

4.5 Strengths

The current study has a number of strengths, first and foremost contributing uniquely to the current field of research, as well as including a complete measure of adaptive behaviour, a high retention rate, and appropriate matching of child characteristics. The current study has contributed uniquely to the field of research, in children prenatally exposed to methadone followed up to middle-school age, in a number of ways. Firstly, only a number of studies have investigated adaptive behaviour outcomes in children prenatally exposed to methadone, with the majority of the studies investigating these effects in toddlers and children before they reach school age (Bada et al., 2008; de Cubas & Field; Hunt et al., 2008; Sarfi et al., 2013). Only one other study has investigated the impact on middle school aged children, however this was only observed within the area of social competency (Soepatmi, 1994). This is often due to the relative difficulty of following this population within longitudinal studies. The current study has a relatively good retention rate with 70% of the ME sample retained up to the current follow-up.

Secondly the current study provides further novel research into the limited area of caregiver stress regarding both their parenting stress and general everyday stress. Kelley (1992) was the only other study identified that had investigated these areas, however this research was completed in caregivers of infants, and not middle-school aged children as discussed within this study. Further research into the everyday stress of these caregivers will further identify important areas for support that they may require.

Thirdly, the current study is the first to assess adaptive behaviour skills as a whole in older middle-school aged children prenatally exposed to methadone, adding to a limited area of research. By using a complete measure of adaptive behaviour as well as separate subscales, the current study was able to show specific areas of deficit as well as their overall level of functioning. As previously mentioned Soepatmi (1994), only investigated social competency

in children aged from 4 to 12 years. Whilst the other studies assessed investigated a more holistic view of adaptive behaviour, this was only assessed in children under the age of 5.

Lastly, the current study has successfully matched child characteristics within this study in regards to their age, gender, and ethnicity. It is particularly important to match these children in age due to the increased acquisition of adaptive behaviour skills as the child ages. The inclusion of matching gender is also important, as differences between the genders may relate to the acquisition of different adaptive behaviour skills; however more research within this area would be required to establish this.

4.6 Limitations

There are a number of limitations inherent within the current study. This includes a lack of independent confirmation of non-drug use from the caregivers of NE children, potential confounds, small sample sizes, reliance on caregiver self-report for child outcomes and the lack of a well validated measure of general stress. Each of these issues is addressed below.

Lack of independent drug confirmation. Although independent confirmation of drug use was obtained through hospital records within the ME sample, this was not achieved within the comparison NE sample. As this group was recruited separately in 2013/2014 retrospective accounts of drug and alcohol use were given. The participants were asked whether they engaged in this activity whilst pregnant and were subsequently included if they had not, and excluded from the study if they had. However, a participant may answer in the negative for a number of reasons such as they do not want to reveal undesirable information for fear of judgement, or they may have simply forgotten about such substance use.

Potential confounds. Within the current study there has been limited consideration of other potential drug exposure in utero including substances such as cigarettes and alcohol and

illicit substance use during pregnancy. Within the opiate dependent population it is common for the use of multiple substances which can potentially confound results. The use of cigarettes and alcohol can also confound results due to possible impacts in utero which may have implications within both the NE and ME groups. Future studies should better account for potential poly-drug use as well as licit substances such as cigarettes and alcohol used during pregnancy and control for these.

Additional confounding factors in the measurement of stress also include potential protective factors such as social support as well as child influences including behavioural problems. Social support is a known protective factor against stress however in the current study this was not measured directly. Caregivers of ME children indicated increased stress surrounding isolation from other adults, as well as being more likely to be single indicating a lack of social interaction and support. In future research an additional measure of social support would add to findings regarding caregiver stress. In regards to child behaviour, past research has indicated child behavioural issues as predictive of subsequent caregiver stress. Although there was no difference in caregiver parenting stress, it would still be of interest to investigate more than one child variable in the measurement of influences on the caregivers reported stress.

Measures. Whilst the PSS has recorded reliability and validity, the Sources of Stress Scale has limited information regarding these constructs. This tool has recently been employed by the Christchurch Health and Development Study however its origins are unknown. Future research will benefit from using a well validated and reliable measure of general everyday stress. A long term measure of stress would also be of benefit to determine whether the stress experienced by these caregivers is chronic or short-term, and whether these stress levels are consistent or change over time. This could not be achieved within the current

study due to its cross-sectional nature, as well as the relatively short time some of these children have been with their caregivers.

In addition to a valid and reliable measure of general stress, a multi-informant measure of child adaptive behaviour would have provided greater reliability and reduced potential caregiver bias. The BASC-2 provides both a teacher rating scale (TRS) and the PRS; however time constraints in completing this thesis allowed only the use of the PRS to measure adaptive behaviour. Limitations include the potential under-reporting of child adaptive problems by caregivers of NE children, or the over-reporting of problems by caregivers of ME children if they are feeling stressed or overwhelmed by their experiences as a caregiver, accounting for the differences observed in adaptive behaviour. Future research should provide a measure of teacher report for an account of adaptive behaviour in multiple settings. It would also be beneficial to have a direct observation of the child within the classroom to identify adaptive behaviour skills directly. Use of the Student Observation System whereby the child is directly observed and coded during 3-second intervals would provide valuable additional information.

Further to additional informants of child adaptive behaviour, a supplementary measure of SES in conjunction with occupational status would have added to the current study's findings. As shown by Cohen et al. (2006) educational achievement provides a valuable measure of SES in addition to occupational status and can provide a buffer against stress.

Retention rate and sample size. Although this study has a good retention rate in comparison to many of the other studies already discussed, the children that have not been re-recruited may represent the families most at risk. These children may be most at risk in terms of their adaptive behaviour, and may contribute to a poorer outcome potentially resulting in more children falling into the At-Risk range. The sample size recruited within the current

study was adequate to ensure power for statistical significance testing between groups; however this sample size was not large enough to generalize to the wider population. There was also a lack in enough participants to perform a within groups analysis to compare adaptive behaviour outcomes between children in regards to their caregiver arrangements. In addition to this, the current study failed to obtain an appropriate comparison sample in terms of other NE caregivers including biological fathers, other relatives and non-relatives. This has proven difficult as can be observed within Bada et al's. (2008) study in which sample sizes for non-biological caregivers in the NE group were small.

4.7 Directions for Future Research

Although the current study has provided novel findings within the area of child adaptive behaviour and prenatal methadone exposure, as well as the implications of this on caregiver stress further assessment is required. Further assessment of middle-school aged children prenatally exposed to methadone with corroborative adaptive behaviour measures would add to the findings of the current study and provide greater reliability within these findings. This includes, as previously mentioned in the limitations, a teacher report of adaptive behaviour, as well as an observational measure. This would provide additional behaviour on how the child interacts with their peers as well as attributes best examined within a school setting. It would also be important to consider and control for potential confounds as previously discussed such as poly-drug use and licit substance use in utero.

As well as providing corroborative measures in the assessment of child adaptive behaviour, future research should also attempt to account for the influence of caregiver type. A larger sample size with greater numbers of non-biological caregivers would provide further information as to the effects of caregiver type on the acquisition of adaptive behaviour in these children. In conjunction with the assessment of caregiver type, it would also be of

future interest to investigate the effect of the number of caregiver changes these children may have experienced and the potential impact on their adaptive behaviour. The number of times a child may have been moved around from home to home may have a direct impact on their behaviour and their learning such as that observed in Bada et al. (2008). Without consistent role models it may be difficult to teach children adaptive behaviour skills such as daily activities, and social skills. It would also be difficult within the classroom environment if these moves contributed to the changing of schools.

Future studies should also provide a greater measure of caregiver stress to determine whether caregivers of ME children are experiencing consistently greater levels of stress, or whether these caregivers appear to be experiencing greater amounts of daily hassles at this point in time. A measure of social support would be of interest to determine whether these caregivers feel supported, and whether NE caregivers might have greater levels of social support. This would provide further evidence as to an increase in support for these caregivers such as support groups or respite care.

Lastly, it would be of great future interest to follow these children into teenage-hood to determine whether the gap in their acquisition of adaptive behaviour skills has further decreased. This would provide novel and new information in the adaptive behaviour skills of teenagers who were prenatally exposed to methadone in utero. This would also provide the opportunity to investigate further influences on adaptive behaviour such as caregiver influences over time.

4.8 Conclusions

Research investigating the effects of prenatal methadone exposure is important to determine the implications on the child's later development, as well as the potential effects this has on the caregivers who care for them. Knowing these implications allows for early

intervention to help those children develop the behaviours and skills necessary for the fulfilment of daily activities. This research also allows for the development of further support systems for these caregivers who have identified a lack of appropriate support in their daily lives.

The aims of this study were threefold; to determine whether there was a significant difference between ME children and NE children in their adaptive behaviour, whether there was a significant difference in the stress levels of caregivers of ME children and caregivers of NE children, and whether there was a significant relationship between child adaptive behaviour and caregiver stress. Findings of this study indicated that although there was a significant difference, both groups of children were within the average range of their adaptive behaviour skills. Findings of this study also indicated that caregivers of ME children reported more general everyday stress than caregivers of NE children; however reported parenting stress was in the low range. Lastly, a significant relationship was not observed between adaptive behaviour and caregiver stress indicating additional influences on caregiver stress not covered within the current study.

In conclusion, the findings of the current study provide novel information into the research of adaptive behaviour in middle-school aged ME children and their caregivers stress levels. The adaptive behaviour scores of these children emphasizes the potential closing of the developmental gap between ME and NE children as expressed in the literature, promoting a greater sense of functionality in day to day life. The specific stressors experienced and reported by ME caregivers also highlights the need for supplementary social supports required to alleviate these daily stressors.

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Appendix A

Health and Disability Ethics Committees

Health and Disability Ethics Committees
1 the Terrace
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28 November 2012

Dr Lianne Woodward
Canterbury Child Development Research Group
Psychology Department
University of Canterbury
Christchurch 8041

Dear Dr Woodward

Re:	**Ethics ref:**	**URB/07/10/042**
	Study title:	Neurodevelopmental Outcomes of Children Exposed to Methadone During Pregnancy at Ages 4.5 and 6 Years: Role of neuroanatomical and Socio-Environmental Factors.

I am pleased to advise that this amendment has been *approved* by the Southern Health and Disability Ethics Committee. This decision was made through the HDEC Expedited Review pathway.

Please don't hesitate to contact the HDEC secretariat for further information. We wish you all the best for your study.

Yours sincerely,

Ms Raewyn Idoine
Chairperson
Southern Health and Disability Ethics Committee

Encl: appendix A: documents submitted
appendix B: statement of compliance and list of members

Appendix B

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

HUMAN ETHICS COMMITTEE

Secretary, Lynda Griffioen
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2013/45/LR

10 June 2013

Jamie Stringer
Department of Psychology
UNIVERSITY OF CANTERBURY

Dear Jamie

Thank you for forwarding your Human Ethics Committee Low Risk application for your research proposal "Adaptive functioning outcomes of children born to mothers engaged in methadone maintenance treatment: the role of maternal depression, anxiety, stress and parenting styles".

I am pleased to advise that this application has been reviewed and I confirm support of the Department's approval for this project.

Please note that this approval is subject to the incorporation of the amendments you have provided.

With best wishes for your project.

Yours sincerely

Lindsey MacDonald
Chair, Human Ethics Committee

Appendix C

Canterbury Child Development
Research Group
Department of Psychology
College of Science

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Are you a mother of a 9 or 10 year old child?

We require 30 mothers of children aged 9/10 years old to participate as control participants in a study investigating developmental outcomes of children

We need mothers who:

- Have a child aged either 9 or 10 years old.
- Live in the Canterbury region.

What is involved?

1. An hour long interview with you about your child's health, behaviour, and development within the family, and also about current family circumstance and your own health and wellbeing.

2. Your child's teacher will be sent and asked to complete a questionnaire about your child's classroom behaviour.

3. You will receive a $10 petrol or grocery voucher for your time and effort.

If you are interested in taking part and would like to know more, please contact Jamie via cell: 027 657 6656 or e-mail: jamie.stringer@pg.canterbury.ac.nz

THIS STUDY HAS BEEN REVIEWED AND APPROVED BY THE DEPARTMENT OF PSYCHOLGY, UNIVERSITY OF CANTERBURY AND THE UNIVERSITY OF CANTERBURY HUMAN ETHICS COMMITTEE LOW RISK PROCESS

Reference: HEC 2013/45/LR

Appendix D

Canterbury Child Development
Research Group
Department of Psychology
College of Science

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

CODE NUMBER

9/ 10 YEAR FOLLOW-UP STUDY
CONSENT FORM

- I have been invited to participate with my child in a study that is comparing the development of children who were and were not born to mothers on methadone maintenance during their pregnancy. I have read and understood the Information sheet dated November 2012.
- I have had enough time to consider whether we will take part in the study, and to discuss my decision with the researcher or a person of my choice.
- I know who to contact if I have any questions about the study.
- I understand that our participation in this research is **confidential** and that no material which could identify me will be used in any study reports, or made available to anyone else without my approval in writing.
- I understand my child will be videotaped during the procedure and that this information will only be used for further observation by the named investigators and the material will be secured and kept strictly confidential.
- I also understand that my child and I can withdraw from the study at any time.
- I understand the compensation provisions for the study.
- I am willing for the research team to contact my child's class teacher to obtain information on my child's school progress during the last year. **YES/NO**
- I agree to members of the research team having access to medical information about my child for cross checking the number and dates of any major or minor illnesses that I have recorded on the study forms. **YES/NO**
- I wish to receive a summary of the results of this study. **YES/NO**

I consent to take part in this study.

Parent/s Name: _____

Signature of Parent/s: _____ **Date**: _____

I consent to my child taking part in this study.

Child's name_____ Parent/s Name: _____

Signature of Parent/s: _____ **Date**: _____

In my opinion, consent was given freely and the participant understands what is involved in this study.

Researcher's Name:_____

Signature of Researcher: _____ **Date**: _____

Child's GP (Family Doctor) Contact Details:

Child's GP

Name:……
……..

Medical
Centre/Practice:……

Address and phone (If known)
……
……
……

Previous GP's and Name of Medical Centres (if changed over past 4 years)

Name:……
……..

Name……
……

Appendix E

CANTERBURY CHILD DEVELOPMENT STUDY

MATERNAL INTERVIEW

9-YEARS

CODE NUMBER | | | |

INTERVIEWER | |

	DD		**MM**		**YY**	
DATE						

SECTION A: FAMILY COMPOSITION

A.1 How old is <name> now?

Years	Months

A.2 How many people live in the household excluding <name>?

Number

A.3 For each person living in the household (excluding <name>) complete the coding frame below.

Person	Age (Years)		Gender	Relationship to survey child
1 (Eldest)				
2				
3				
4				
5				
6				
7				
8				
9 (Youngest)				

Coding:

Age: Self code in whole years; NA = 99

Gender: Female = 1; Male = 2; NA = 9

Relationship to child: Natural parent = 1; Natural sibling = 2; Step parent = 3; Step sibling = 4; Half sibling = 5; Adoptive sibling = 6; Other relative = 7; Non relative = 8; NA = 9

A.4 How long have you lived in this household?

Years		
Months		

A.5 Have you had any changes of residence since our last interview? If so, how many?

Number of changes		

A.6 Complete the coding frame below giving details of the child's parent-figures during each month of life since the last interview. If the child's parent-figures changed within a two-month period record the person who was acting as parent-figure for the longest time. Ignore temporary absences of mother or father for holidays, business trips etc, except if these are longer than one month. Coding instructions are given at the foot of the frame.

Time	Mother Figure	Father Figure	Change of Mother-Figure and reason		Change of Father-Figure and reason	
First year of school						
2nd year at school Yr2						
3rd year at school Yr3						
4th Year at school Yr4						
Last year Yr5						

Coding:

Mother Figure: Natural mother = 0, Adoptive mother = 1, Foster mother = 2, Step mother = 3, Grandmother = 4, De facto mother (not natural mother, etc) = 5, Relative = 6, Non-relative = 7, No mother figure = 8, Not known = 9.

Father Figure: Natural father = 0, Adoptive father = 1, Foster father = 2, Step father = 3, Grandfather = 4, De facto father (not natural father, etc) = 5, Relative = 6, Non-relative = 7, No father figure = 8, Not known = 9

Change and Reason: (This is coded in the same way for both mother and father figures):	No change = 00, Parents separated = 01, Parents reconciled = 02, Parent died = 03, Parent discharged from or admitted to hospital = 04, Parent discharged from or admitted to prison = 05, Child admitted to or discharged from hospital = 06, Child in Social Welfare custody = 07, Child adopted or fostered = 08, Other = 09, Not known = 99.

Details:……
……
……...

A.7 Since <name> began school, has there been anyone other than yourself that you believe has played a significant role in his/her upbringing?

If yes, who and why?.....

…….

…….

Yes	No
1	2

A.8 Have you had over the last year or do you currently have a steady partner?

Yes	No
1	2

IF YES ASK A.9, A.10, & A.11. IF NO ENDORSE THESE ITEMS WITH 9's AND SKIP TO A.12

A.9 How old is your partner? Years

A.10 How long have you had a relationship with your partner?

<3 months	1
3-5 months	2
6-11 months	3
12+ months	4
NA	9

A.11 What is your relationship to your partner?

	Going out casually	1
	Going out seriously	2
	Living together as a couple	3
	Engaged to be married	4
	Married	5
If other specify: _____	Other	6
_____	NA	9

A.12 a) Do you have an ex-partner that remains in regular contact with your child?

Yes	No
1	2

b) Does the child's father remain in regular contact with your child?

Yes	No
1	2

IF NOT BIOLOGICAL MOTHER ASK A.13, OTHERWISE MARK AS N/A

A.13 Does the child's birth mother remain in regular contact with the child?

Yes	No	N/A
1	2	9

SECTION B: FAMILY FINANCES

B.1 What type of accommodation do you currently live in?

If other, specify: _____

_____

Detached house	1
Townhouse/Ownership Flat	2
Flat (not ownership)	3
Other	4

B.2 Is your accommodation

If other, specify: _____

_____

_____

Owned/mortgaged	1
Rented from private owner	2
Rented from Housing NZ (state house)	3
Rented from local authority (eg City Council)	4
Other (eg boarding)	5

B.3 How many bedrooms does your accommodation have?

Number [ ]

B.4 Overall, how adequate is your present accommodation to meet your family's needs?

More than adequate	1
Adequate	2
Inadequate	3
Very inadequate	4

If respondent reports accommodation is inadequate or very inadequate, record reasons for inadequacy below:

_____

_____

_____

B.5 Do you currently work in paid employment?

Yes	No
1	2

If yes, specify: NZSCO | | | |

a) Occupation: _____

b) Industry: _____

c) Number of hours per week (If not working enter 00) Hours | | |

d) How much do you receive each week after tax? (If not working enter 0's)

$ | | | | |

B.6 What would be your total family income **before taxes** for the last 12 months?

Zero income or loss	0
$1 – $5,000	1
$5,001-$10,000	2
$10,001 – $15,0000	3
$15,001 – $20,000	4
$20,001 – $25,000	5
$25,001 – $30,0000	6
$30,001 – $40,000	7
$40,001 – $50,000	8
$50,001 – $70,000	9
$70,001 – $100,000	10
$100,001 or more	11
NA/Can't say	99

IF NO COHABITING PARTNER ENTER 9's IN B.7 – B.8

B.7 Does your partner work in paid employment?

Yes	1
No	2
NA	9

If yes, specify: NZSCO | | | |

a) Occupation: _____

b) Industry: _____

c) Hours per week worked (If not working enter 00) Hours | | |

d) How much does he receive each week after tax? (If not working enter 0's) $ | | | | |

B.8 Do you or your partner receive any Family Assistance payments (that are not already included above)?

Yes	No	N/A
1	2	9

B.9 Since our last interview have you had to do any of the following because you were short of money

	Yes	No
Borrow money from family or friends	1	2
Been unable to pay electricity bill	1	2
Been unable to pay rent	1	2
Been unable to pay phone bill	1	2
Gone without meals on some days	1	2
Bought second-hand clothing	1	2

Postponed visits to the doctor	1	2
Postponed visits to the dentist	1	2
Visited budget advisory service	1	2
Been declared bankrupt	1	2
Had something repossessed because you couldn't keep up the payments	1	2
Received a summons regarding unpaid bills	1	2
Had to sell or pawn belongings to get money	1	2
Needed to seek help from the food bank or a social agency	1	2
Needed to seek assistance from WINZ to pay bills	1	2
Moved to cheaper accommodation	1	2

B.10 Have you obtained any new educational or employment related qualifications in the past 4 years?

If yes, specify: _____	Yes	1
_____	No	2

SECTION C: THE CHILD

C.1 At the present time do you have any concerns about the following aspects of your child's development?

a) Her/his physical co-ordination, e.g., clumsy, always tripping over, walks poorly.

If yes, specify: _____	Yes	1
_____	No	2

b) Her/his language development, e.g., speech difficult to understand, does not talk well compared to same aged peers.

If yes, specify:		
_____	Yes	1
_____	No	2

c) Her/his growth or height or weight, e.g., small for age, or overweight.

If yes, specify:		
_____	Yes	1
_____	No	2

d) Her/his intellectual development, e.g., doesn't seem to understand things, is slow to "catch on" to things.

If yes, specify:		
_____	Yes	1
_____	No	2

e) Eating problems, e.g., eats poorly or eats too much.

If yes, specify:		
_____	Yes	1
_____	No	2

f) Toileting problems.

If yes, specify:		
_____	Yes	1
_____	No	2

g) Health problems.

If yes, specify:		
_____	Yes	1
_____	No	2

h) Any other problem or concern.

If yes, specify:

_____

_____

Yes	1
No	2

SECTION D: CHILD HEALTH

General Health Conditions

D.1 Has your child been diagnosed with, or been suspected of having, any of the following conditions?

	No	Suspected	Yes
Asthma/wheezy bronchitis	0	1	2
Hayfever	0	1	2
Eczema/skin rash	0	1	2
Ear infections	0	1	2
Vision problems	0	1 Go to D2	2 Go to D2
Hearing loss	0	1 Go to D3	2 Go to D3
ADHD	0	1	2
Food allergies	0	1	2
Coeliac disease or Gluten free	0	1	2
Poor growth	0	1	2

Tell us of any other health problems not mentioned here:
_____
_____
_____
_____

D.2 If parent reports visual problems, what kind of visual difficulties does your child have?

Short sighted (no glasses)	1
Short sighted (has glasses)	2
Long sighted (no glasses)	3
Long sighted (has glasses)	4
Other	5

Other visual problem (please specify):

D.3 a) What kind of hearing loss does your child have?

Needs hearing aides	1
Glue ear/ needs grommets	2
Frequent infections	3
Other	4

Other hearing problem (please specify):

D.4 Has your child ever needed an operation for grommets/ adenoidectomy/ tonsillectomy/ other ?

If other please specify……

……

Yes	1
No	2

Medication

D.5 Is your child currently on any form of prescribed medication?

Yes	No
1	2

If Yes, please give details/names of medicines: ……

……

If not sure of name, circle the type of medicine:

ASTHMA / CONSTIPATION / ADHD / IRON / MULITVITIMINS / OTHER

D.6. Has your child ever required fillings for dental caries?

If Yes how many?.....

Yes	No
1	2

SECTION E: EDUCATION AND CHILDCARE

E.1
a) What school is your child attending at present?

Schools name: _____

Teachers Name: _____

_____

b) Type of school?

Public	1
Private non-church	2
Private church	3
Special school	4
Other	5
Does not go to school	6

If other please specify:

E.2. Is your child currently experiencing any problems or difficulties at school?

Specify…….

…….

…….

Yes	1
No	2

E.3. a) Does your child currently receive any of the following school support resources:

	Yes	No
School based support services (e.g. Individual needs)	1	2
OORS (Ongoing and Reviewable Resourcing Schemes) Funding	1	2
Number works	1	2

Specialist psychological or educational assessment	1	2
Paediatric services	1	2
Attends special school e.g. Seabrook Mckenzie, Allandale	1	2
Speech and Language Therapy	1	2
Resource Teachers: Learning and Behaviour Association (RTLB)	1	2
Other (e.g extension classes), please specify:	1	2

b) Has your child ever received any of those resources since starting school?

Yes	No
1	2

Details of any help received:

Help1)……

……

……

Help2)……

……

……

Help3)……

……

……

E.4 How does <name> feel about school?

	Always	Usually	Sometimes	Not at all
a) Looks forward to going	1	2	3	4
b) Enjoys it	1	2	3	4
c) Is stimulated by it	1	2	3	4
d) Is frightened by it	1	2	3	4
e) Talks about his or her friends	1	2	3	4
f) Seems bored by school	1	2	3	4
g) Likes his/her teacher(s)	1	2	3	4

E.5 During the last school year, has you child ever refused to go to school?

Yes	1
No	2

E.6 During the last school year has your child ever played truant from school?

Yes	1
No	2

E.7 During the last school year has your child ever been sent to the principals office?

If yes do you know why?.....

Yes	1
No	2

E.8 During the last school year has your child ever been given detention?

If yes do you know why?.....

Yes	1
No	2

E.9 During the last school year has your child's teacher or principal ever requested a private meeting with you?

If yes, what was the meeting for?.....

……

……

Yes	1
No	2

E.10 Parental Satisfaction/Investment

	Yes, very	Yes, mostly	No, not really
a) Are you interested in what your child does at school?	1	2	3
b) Are you happy with the teaching your child is getting at school?	1	2	3
c) Are you happy with the progress your child is making at school?	1	2	3

SECTION F: CHILD DISCIPLINE AND PHYSICAL PUNISHMENT

F.1 Children often do things that are wrong, disobey or make their parents angry. We would like to know what you or your partner have done when <child's name> did something wrong or made you upset or angry.

I am going to read a list of things you or your partner might have done in the past year and would like you to tell me which of the numbers on this card best describes the number of times you or your partner have done each of these things in the past year.

INTERVIEWER: YOU WILL FIRST NEED TO ESTABLISH WHETHER MOTHER HAS HAD A RESIDENT PARTNER IN THE PAST YEAR. IF THERE HAS BEEN NO PARTNER ENTER 0's FOR PARTNER ITEMS. IN THE CASE OF MULTIPLE PARTNERS RECORD TOTAL EPISODES FOR ALL PARTNERS

Coding: 0 = never; 1 = once only; 2 = twice only; 3 = 3-5 times; 4 = 6-10 times; 5 = 11-20 times, 6 = 21+ times.

	Mother	Partner
Explained why something was wrong		
Put <name> in "time out" (or sent to his/her room)		
Shook <name>		
Hit <name> on the bottom with something like a belt, hairbrush, a stick or some other hard object		
Gave <name> something else to do instead of what he/she was doing wrong		
Shouted, yelled, or screamed at <name>		
Hit <name> with a fist or kicked her/him hard		
Smacked <name> on the bottom with your bare hand		
Grabbed <name> around the neck and choked her/him		
Swore or cursed at <name>		
Hit <name> over and over as hard as you could		
Burned or scalded <name> on purpose		
Threatened to smack or hit <name> but did not actually do it		

Hit <name> on some other part of the body besides the bottom with something like a belt, hairbrush, a stick or some other hard object		
Slapped <name> on the hand, arm or leg		
Took away privileges or a toy		
Pinched <name>		
Threw or knocked <name> down		
Called <name> dumb or lazy or some other name like that		
Slapped <name> on the face, head or ears		

F.2 Since our last interview, have you ever been so angry with <name> that you felt like smacking or shaking him/her?

No never	1
Yes sometimes	2
Yes often	3

F.3. On how many occasions over the last week have you smacked or shaken your child?

Four or more times	1
Three times	2
Twice	3
Once	4
None	5

F.4 Since our last interview, have you ever smacked or hit <name> so hard that you hurt him/her?

Yes	1
No	2

If yes, ask mother to describe incident. If more than one incident, choose the incident that the mother sees as the most serious.

What led to the incident: _____

What happened: _____

_____

Consequences for <name>: _____

_____

F.5 Do you ever feel that you might lose control and really hurt <name>?

No never	1
Yes sometimes	2
Yes often	3

F.6 Since our last interview, have you had any contact with an agency or organisation concerning physical child abuse?

Yes	1
No	2

If yes, specify: agency, when contact was made, reason for contact and outcome.

When:

_____

Agency:

_____

Reason:

_____

Outcome:

_____

F.7 Since our last interview, has your partner (or ex-partner) ever been so angry with <name> that he has threatened to hit or shake him/her?

No never	1
Yes sometimes	2
Yes often	3
NA	9

F.8 Since our last interview, has your partner (or ex-partner) ever smacked or shaken <name>?

No never	1
Yes sometimes	2
Yes often	3
NA	9

F.9 Since our last interview, has your partner (or ex-partner) ever smacked or hit <name> so hard that he has hurt him/her?

Yes	1
No	2
NA	9

If yes, ask mother to describe incident. If more than one incident, choose the incident that the mother sees as the most serious.

What led to the incident: _____

What happened: _____

_____

Consequences for <name>: _____

_____

F.10 Since our last interview, have you ever been concerned that your partner (or ex-partner) might lose control and really hurt <name>?

No never	1
Yes sometimes	2
Yes often	3
NA	9

F.11 Since our last interview, has your partner (or ex-partner) ever been in contact with any agency or organisation regarding physical child abuse?

If yes, specify agency, when contact was made, reason for contact and outcome.

When:_____

Agency:_____

Reason:_____

Outcome:_____

Yes	1
No	2
NA	9

F.12 Since our last interview have you or your partner (ex-partner) received any counselling courses regarding parenting, anger management or stopping violence?

If yes specify course and circumstances leading to course attendance

_____

_____

Yes	1
No	2

F.13 Since our last interview, have you or your partner (ex-partner) been the subject of a complaint to the Child Youth and Family Service regarding your treatment of <name>?

Yes	No
1	2

If yes, specify source of complaint, details of allegation and outcome:…….....

……

……

F.1.4 Since our last interview, have you or your partner (ex-partner) ever attended a court hearing regarding your treatment of <name>?

Yes	No
1	2

If yes, specify details of the case:

……..

……..

……

SECTION G: BEING A PARENT

G.1 I am going to read a list of statements about how parents' react and respond to their children. Please look at the following scale and select one number which reflects your typical behaviours. *(SHOW PARENT THE CODING SCALE BELOW)*

CODING: 1 = Very much like the description on the left.
2 = A little like the description on the left.
3 = The midpoint of the scale indicates that you typically do not do either of these behaviours or do them both equally.
4 = A little like the description on the right.
5 = Very much like the description on the right.

When my child misbehaves …

1. I get so frustrated or angry that my child can see I'm upset	1	2	3	4	5	I handle it without getting upset
2. Things build up and I do things I don't mean to	1	2	3	4	5	Things do not get out of hand
3. I raise my voice and yell	1	2	3	4	5	I speak to my child calmly
4. I hold a grudge	1	2	3	4	5	Things get back to normal pretty quickly

1. I insult my child, say mean things, or call my child names	1	2	3	4	5	I can speak to my child without saying mean things
2. I often get into a long argument with my child	1	2	3	4	5	My child and I rarely get into long arguments

3. I give my child a long lecture	1	2	3	4	5	I keep my talks short and to the point
4. I often use bad language or curse / swear	1	2	3	4	5	I rarely use bad language
5. I make my child tell me why he/she did it	1	2	3	4	5	I say “no” or take some other action
6. I say a lot	1	2	3	4	5	I say very little
7. If saying no doesn’t work right away, I keep talking and try to get through to my child	1	2	3	4	5	I take some other kind of action
8. If my child talks back or complains when I can’t handle a problem, I give a talk about not complaining	1	2	3	4	5	I ignore the complaining and stick to what I said
9. I give my child several reminders or warnings	1	2	3	4	5	I use only one reminder or warning

When I’m upset or under stress…….

10. I’m on my child’s back (critical, nagging)	1	2	3	4	5	I am no more picky than usual
11. I blame my child for causing me problems	1	2	3	4	5	I don’t find fault with my children

12. I get irritated by my child’s needs / demands	1	2	3	4	5	I don’t get irritated at all by my child’s needs / demands

13. My children are afraid of me	1	2	3	4	5	My children rarely notice anything is wrong

When I say my child can't do something…

14.	I let my child do it anyway	1	2	3	4	5	I stick to what I said

If my child gets upset…

15.	I back down and give in	1	2	3	4	5	I stick to what I said

When my child does something I don't like…

16.	I often let it go	1	2	3	4	5	I do something about it every time it happens

When I give a clear threat or warning…

17.	I often don't carry it out	1	2	3	4	5	I always do what I said

When my child won't do what I ask…

18. I often let it go or do it myself	1	2	3	4	5	I take some other action

If saying "no" doesn't work…

5. I offer my child something nice so he/she will behave	1	2	3	4	5	I take some other kind of action
6. I coax or beg my child to stop	1	2	3	4	5	I firmly tell my child to stop
7. I let my child do whatever he or she wants	1	2	3	4	5	I set limits on what my child can do
8. I threaten to do things that I know I won't actually do	1	2	3	4	5	I only threaten things I am sure I can carry out

If my child misbehaves and then acts sorry…

9. I let it go that time	1	2	3	4	5	I handle the problem like I usually would

When we're not at home…

10. I let my child get away with a lot more	1	2	3	4	5	I handle my child the same way

When my child misbehaves…						
I do something right away	1	2	3	4	5	I do something about it later
When my child pesters me…						
I can ignored the pestering	1	2	3	4	5	I can't ignore the pestering
When my child is out of sight…						
I often don't know what my child is doing	1	2	3	4	5	I always have a good idea of what my child is doing
When my child misbehaves, I spank, slap, grab, or hit my child…						
Never or rarely	1	2	3	4	5	Most of the time
When I have to handle a problem…						
I tell my child I'm sorry about it	1	2	3	4	5	I don't say I'm sorry

SECTION H: MATERNAL HEALTH

H.1 Over the last month/last year have you had a period of at least two weeks when you	Last month? Yes	Last month? No	Last year? Yes	Last year? No
Felt sad, blue or depressed every day	1	2	1	2
Lost interest in most things like work, your family, hobbies, etc	1	2	1	2
You lost your appetite	1	2	1	2
Had an increase in appetite	1	2	1	2
Gained weight	1	2	1	2
Had trouble falling asleep every night	1	2	1	2
Had trouble staying asleep every night	1	2	1	2
Were waking up too early in the morning	1	2	1	2
Were sleeping too much (nearly every night)	1	2	1	2
Felt slowed up in your speech or movements most days	1	2	1	2
Felt restless, couldn't sit still or paced up and down	1	2	1	2
Felt tired, lacking in energy all the time	1	2	1	2
Felt worthless, guilty or sinful most days	1	2	1	2
Felt inferior, not as good as others	1	2	1	2
Lacked self confidence	1	2	1	2
Felt slowed up in your thinking	1	2	1	2
Your thoughts were all mixed up	1	2	1	2
Could not make up your mind about things	1	2	1	2
Thought a lot about death (your own, someone else's or death in general)	1	2	1	2
Felt like you wanted to die	1	2	1	2

(ANSWER H.2 IF YOU HAVE ANSWERED YES TO ONE OR MORE OF THE ITEMS IN H.1, OTHERWISE SKIP TO H.3)

H.2 To what extent have these feelings interfered with:	Not at All	A Little	A Great Deal	NA
Your ability to care for your child/children	1	2	3	9
Your ability to look after the house	1	2	3	9
Your relationships with your friends	1	2	3	9
Your relationship with family members and relatives	1	2	3	9
Your paid employment	1	2	3	9
Your ability to do things you enjoy (hobbies, going out, etc)	1	2	3	9

H.3 Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have bothered by each symptom during the PAST WEEK, INCLUDING TODAY, by circling the corresponding number in the column next to each symptom.

		Not at all	Mildly. It did not bother me much	Moderately. Unpleasant but I could stand it	Severely. I could barely stand it
1.	Numbness or tingling	0	1	2	3
2.	Feeling hot	0	1	2	3
3.	Wobbliness in legs	0	1	2	3
4.	Unable to relax	0	1	2	3
5.	Fear of the worst happening	0	1	2	3
6.	Dizzy or lightheaded	0	1	2	3
7.	Heart pounding or racing	0	1	2	3
8.	Unsteady	0	1	2	3
9.	Terrified	0	1	2	3

10.	Nervous	0	1	2	3
11.	Feelings of choking	0	1	2	3
12.	Hands trembling	0	1	2	3
13.	Shaky	0	1	2	3
14.	Fear of losing control	0	1	2	3
15.	Difficulty breathing	0	1	2	3
16.	Fear of dying	0	1	2	3
17.	Scared	0	1	2	3
18.	Indigestion or discomfort in abdomen	0	1	2	3
19.	Faint	0	1	2	3
20.	Face flushed	0	1	2	3
21.	Sweating (not due to heat)	0	1	2	3

H.4 Below is a list of social situations that commonly cause anxiety. Please carefully read each item in the list. Using the scale below, indicate (by placing the corresponding number in the column next to each situation) how much fear or anxiety each situation would evoke **and** how often you would avoid each situation.

Fear or Anxiety
0 = None
1 = Mild
2 = Moderate
3 = Severe

Avoidance
0 = Never (0%)
1 = Occasionally (1-33%)
2 = Often (33-67%)
3 = Usually (67-100%)

		Fear or Anxiety	Avoidance	
1.	Telephoning in public. (P)			1.
2.	Participating in small groups. (P)			2.
3.	Eating in public places. (P)			3.
4.	Drinking with others in public places. (P)			4.
5.	Talking to people in authority. (S)			5.

6.	Acting, performing or giving a talk in front of an audience. (P)			6.
7.	Going to a party. (S)			7.
8.	Working while being observed. (P)			8.
9.	Writing while being observed. (P)			9.
10.	Calling someone you don't know very well. (S)			10.
11.	Talking with people you don't know very well. (S)			11.
12.	Meeting strangers. (S)			12.
13.	Urinating in a public bathroom. (P)			13.
14.	Entering a room when others are already seated. (P)			14.
15.	Being the centre of attention. (S)			15.
16.	Speaking up at a meeting. (P)			16.
17	Taking a test. (P)			17
18.	Expressing a disagreement or disapproval to people you don't know very well. (S)			18.
		Fear or Anxiety	Avoidance	
19.	Looking at people you don't very well in the eyes. (S)			19.
20.	Giving a report to a group. (P)			20.
21.	Trying to pick up someone. (P)			21.
22.	Returning goods to a store. (S)			22.
23.	Giving a party. (S)			23.
24.	Resisting a high pressure salesperson. (S)			24.

H.5. Are you currently seeking advice, counselling or other support for problems with depression or anxiety?

If yes, give details below:
_____

_____

Yes	1
No	2

H.6. a) Are you currently taking medication prescribed by a doctor for depression or anxiety?

If yes, specify: _____	Yes	1
_____	No	2

b) Did you take the medication as directed?

If not, why not: _____	Yes	1
_____	No	2
	No medication	9

H.7. Are you currently seeking treatment for a health related problem?

If yes, give details: _____	Yes	1
_____	No	2

SECTION I: CIGARETTES AND ALCOHOL

I.1 Over the last month have you smoked a cigarette or cigarettes? If so, how many cigarettes would you smoke per day?

Non smoker	1
<1 per day	2
1-4 per day	3
5-9 per day	4
10-20 per day	5
21+ per day	6

IF NO COHABITING PARTNER ENTER 9

I.2 Over the last month would your partner have smoked a cigarette or cigarettes? If yes, how many cigarettes would he smoke per day?

Non smoker	1
<1 per day	2
1-4 per day	3
5-9 per day	4
10-20 per day	5
21+ per day	6
No partner	9

I.3 Are there any other people in your household who smoke?

Yes	1
No	2

IF RESPONDENT NEVER DRINKS ALCOHOL ENTER 0's IN I.4 & I.5

I.4 For the next questions when I use the word "drink", I mean a glass of wine, a can or bottle of beer, a shot or nip of spirits, either alone or in a mixed drink.

a) In a typical week when you have something to drink, how many drinks would you have in total from Monday to Thursday (four days)?

Number of drinks | | |

b) And how many drinks would you usually have, in total, from Friday to Sunday (three days)?

Number of drinks | | |

c) In the past year how many times would you have had 6 or more drinks in one sitting or occasion?
(If more than 98 occasions enter 98)

Number of occasions | | |

d) On the last occasion you drank how many drinks in total would you have consumed over the session/occasion?

Number of drinks | | |

e) What is the most you have drunk in one session or occasion in the past 12 months?

Number of drinks | | |

I.5 On how many occasions in the past 12 months would you have got seriously drunk? Number | | |

I.6 In the last 12 months, have any of the following happened as a result of your drinking?

	Yes	No
Arguments with your husband, partner or boyfriend	1	2
Arguments with friends or family members	1	2
Getting into fights	1	2
Getting into trouble with the Police	1	2
Financial problems	1	2

You or someone else having an accident or getting injured (as a result of your drinking)	1	2
Missing out on important activities or obligations because you'd been drinking	1	2
Having difficulty stopping drinking before you were drunk	1	2
Drinking much more or for much longer than you intended	1	2
Spending large amounts of time drinking or getting over its effects	1	2
Has drinking made you feel depressed, guilty or distrustful of others?	1	2
Have you attempted to quit or cut down on your drinking and found you couldn't?	1	2

IF MOTHER HAS HAD A RESIDENT PARTNER AT ANY TIME IN THE PAST 12 MONTHS ASK I.7 - I.10, OTHERWISE ENDORSE THESE ITEMS WITH 9's

I.7 How often does your partner (ex-partner) drink alcohol?

Never	1
Very occasionally	2
At least monthly	3
At least weekly	4
Most days	5
NA	9

IF NO PARTNER ENTER 9's IN I.8 – I.10. IF PARTNER DOES NOT DRINK ENTER 0's IN I.8 - I.19 AND 2's IN I.10.

I.8

a) In a typical week when your partner have something to drink, how many drinks would they have in total from <u>Monday to Thursday (four days)?</u>

Number of drinks | | |

b) And how many drinks would they usually have, in total, from Friday to Sunday (three days)?

Number of drinks | | |

c) In the past year how many times would they have had 6 or more drinks in one sitting or occasion?
(If more than 98 occasions enter 98)

Number of occasions | | |

d) On the last occasion they drank how many drinks in total would they have consumed over the session/occasion?

Number of drinks | | |

e) What is the most they have drunk in one session or occasion in the past 12 months?

Number of drinks | | |

I.9 To your knowledge, on how many occasions in the past 12 months would your partner (ex-partner) have got seriously drunk?

Number | | |

I.10 In the past 12 months, have any of the following happened as a result of your partner's drinking?

	Yes	No	NA
Problems in your relationship with your partner	1	2	9
He got into arguments with friends or family members	1	2	9
He got into fights	1	2	9
He got into trouble with the Police	1	2	9
Financial problems	1	2	9

He or someone else had an accident or got injured (as a result of his drinking)	1	2	9
Missing out on important activities or obligations because he'd been drinking	1	2	9
He had difficulty stopping drinking before he was drunk	1	2	9
Drinking much more or for much longer than he intended	1	2	9
Spending large amounts of time drinking or getting over its effects	1	2	9
Drinking made him feel depressed, guilty or distrustful of others	1	2	9
Has he attempted to quit or cut down on his drinking and found he couldn't?	1	2	9

SECTION J: OTHER SUBSTANCE USE

J.1 Since (name) started school, have you used cannabis?

Yes	1
No	2

IF YES TO J.1 ASK J.2 - J.3. OTHERWISE ENDORSE THESE ITEMS WITH 9's AND ASK J.4

J.2 At the present time how often do you use cannabis?

Nearly every day	1
At least once a week	2
At least once a month	3
Less than once a month	4
Not used cannabis in past 12 months	9

J.3	Over the last 12 months, has your use of cannabis resulted in	Yes	No	NA
	Problems with your family	1	2	9
	Problems with your friends	1	2	9
	Problems with the Police	1	2	9
	Problems with your husband/partner/boyfriend	1	2	9
	You being in a situation where being high increased your chances of being hurt, having an accident	1	2	9
	You having a strong and irresistible desire to smoke cannabis	1	2	9
	You wishing to stop or cut down on using cannabis but finding you couldn't	1	2	9
	Often using larger amounts of cannabis than you intended to when you started	1	2	9
	Using cannabis for longer than you intended to	1	2	9
	Spending a great deal of time using cannabis or getting over its effects	1	2	9
	Having to use more to get the same effect	1	2	9
	Having withdrawal symptoms if you tried to stop or cut down on using cannabis (e.g. feeling sick, headaches etc)	1	2	9
	Problems with your health	1	2	9
	Psychological problems	1	2	9
	Have you ever stolen goods or money in order to buy cannabis	1	2	9

J.4 Over the last 30 days have you used any of the following

	Frequency (Days)	Amount used over a 24 Hour Period	Route (Oral, Nasal, Smoke)
Heroin (*China, White, Tar, homebake, Misti*)		(# $)	
Methadone *(Unprescribed LAAM)*		(# mg)	
Painkillers *(Other opiates/analgesics, morphine, Demerol, Percoset, Fentanyl, 4's, Codeine, Dilaudid, Quaaludes, Goofballs, Ts, Downs, Downers, 714's, Ludes, Reds, Junk)*		(# mg)	
Barbiturates		(# pills)	
Other sedatives *(Hypnotics, tranquilizers, Bennies, Traxene, Benzodiazepines, Valium, Librium, Xanax)*		(# pills)	
Cocaine (*Coke, candy, snow, white lady, crack, ice, flake, toot, rock, freebase)*		(# $)	
Methamphetamine *(Crystal, crank)*		(# mg)	
Ectasy *(Adam)*		(# pills)	
Amphetamines *(Dexedrine, dexies, bennies, black beauties, uppers, speed, ups)*		(# pills)	
Cannabis *(Marijuana, THC, pot, reefer, weed, grass, smoke, boo)*		(# joints)	
Hallucinogens *(LSD, acid, PCP, Angel dust, DMT, STP, trips, mescaline, lotter, green flakes, magic mushroom, TIC, killer weed)*			
Inhalants *(Glue, gas, solvents, nitrous oxide/whippets, amyl nitrate/poppers)*			

J.5 a) In the last 12 months, have you consulted a doctor or sought other advice, counselling or treatment for problems with alcohol, cannabis or other drugs?

	Number of Contacts
General practitioner	
Psychiatrist	
Psychologist	
Substance abuse counsellor/clinic	
Other, specify:	

b) For each contact give details of advice/treatment

EPISODE 1. Date: Reason(s) for seeking help: Source of advice/treatment: Treatment/outcome: Duration of Treatment:
EPISODE 2. Date: Reason(s) for seeking help: Source of advice/treatment: Treatment/outcome: Duration of Treatment:
EPISODE 3. Date: Reason(s) for seeking help: Source of advice/treatment: Treatment/outcome: Duration of Treatment:

IF RESPONDENT HAS SOUGHT ADVICE/TREATMENT ASK J.6, OTHERWISE ENDORSE J.6 WITH 9's AND SKIP TO J.7

J.6 What led you to seek treatment?	Yes	No	NA
You felt you needed treatment	1	2	9
Parents felt you needed treatment	1	2	9
Boyfriend/partner felt you needed treatment	1	2	9
Friends felt you needed treatment	1	2	9
Counsellor suggested you seek treatment	1	2	9
Ordered to by the Court or Police	1	2	9
Others suggested you needed treatment. Specify:	1	2	9

	J.7 Drug use in the home	Yes	No
	Has your child ever accidentally seen you using drugs?	1	2
	Has your child ever accidentally seen you buy drugs?	1	2
	Has your child ever accidentally seen you inject drugs?	1	2
	Has your child ever accidentally seen anyone else in the house buy drugs or use drugs?	1	2
	Have your child ever found drugs in the house by mistake?	1	2

	J.8 Prescribed Drugs	Yes	No
a)	Are you currently being prescribed methadone?	1	2

If yes, what is your prescribed dose level? _____mg/day

If no and have previously been on methadone, how long ago did they stop?.....

		Yes	No	N/A
b)	Does your child know you are on the methadone program?	1	2	9

If Yes do they know why?

Yes	No	N/A
1	2	9

		Yes	No
c)	Are you currently on any prescribed medication other than methadone?	1	2

If yes, please specify_____

IF MOTHER HAS HAD A RESIDENT PARTNER IN PAST 12 MONTHS ASK J.9
OTHERWISE ENDORSE THESE ITEMS WITH 9'S

J.9. In the last 12 months, has your partner (or ex-partner) used any of the following drugs?	Yes	No	NA
Cannabis	1	2	9
Solvents - glue, petrol, etc	1	2	9
Sedatives - downers	1	2	9
Stimulants - amphetamines/methamphetamines ('P')	1	2	9
Heroin/homebake	1	2	9
Morphine/MSTs	1	2	9
Cocaine	1	2	9
LSD, PCP, ecstasy (or other designer drugs)	1	2	9
Any other substance. Specify:	1	2	9

SECTION K: PROBLEMS IN THE LAST YEAR

K.1 a) Over the last year, have you had any contact with the following agencies for these problems?

	No. of Times
Contact with the Police as a result of your involvement in property or violent crime	
Contact with the Police for traffic offences you have committed (including speed camera fines)	
Contact with the Police for alcohol or drug related offences	
Contact with the Police as a result of domestic violence	
Contact with a debt collection agency for unpaid bills	
Contact with Work and Income NZ because of benefit overpayments or suspected overpayments	
Contact with the Family Court concerning child custody or other issues	
Have you appeared in court in the last year	
Have you received a court conviction in the last year	

b) For each incident above give details below:

INCIDENT 1:

Description of incident: _____

_____

Agency involved: _____

Outcome: _____

INCIDENT 2:

Description of incident: _____

_____

Agency involved: _____

Outcome: _____

INCIDENT 3:

Description of incident: _____

_____

Agency involved: _____

Outcome: _____

INCIDENT 4:

Description of incident: _____

_____

Agency involved: _____

Outcome: _____

IF MORE THAN FOUR INCIDENTS RECORD DETAILS BELOW

K.2 Since (name) started school, have you had any contact with Child, Youth and Family Services?

Yes	1
No	2

If yes give details:

When:_____

Reason for contact: _____

_____

Outcome of contact: _____

_____

SECTION L: PARTNERS AND PARTNER RELATIONSHIPS

L.1 Thinking about your current (most recent) relationship, to what extent do the following statements describe your relationship with your partner?	Doesn't Apply	Applies Somewhat	Def. Applies	NA
I have (had) a sense of "belonging" with my partner	1	2	3	9
I tell (told) my partner intimate things about myself	1	2	3	9
We frequently argue(d) with each other	1	2	3	9
I "give" ("gave") a lot to our relationship	1	2	3	9
I try (tried) to change things about my partner that bother(ed) me (eg behaviours, attitudes)	1	2	3	9
I feel (felt) confused about my feelings towards my partner	1	2	3	9
I love(d) my partner very much	1	2	3	9

	Doesn't Apply	Applies Somewhat	Def. Applies	NA
We often discuss(ed) and help(ed) each other solve problems	1	2	3	9
I worry (worried) about losing my independence by being in this relationship	1	2	3	9
Things that happen(ed) to my partner affect(ed) and are (were) important to me	1	2	3	9
We often talk(ed) about the quality of our relationship (eg how good it is, how satisfying etc)	1	2	3	9
I often feel (felt) angry and resentful towards my partner	1	2	3	9
This relationship feels (felt) more special than others I have been in	1	2	3	9
I try (tried) to change my own behaviour to help solve problems with my partner	1	2	3	9
I am (was) unsure about whether to continue this relationship	1	2	3	9
I feel (felt) a strong commitment to this relationship	1	2	3	9
I feel (felt) very close to my partner	1	2	3	9
My partner demands (ed) or requires (ed) too much of my time and attention	1	2	3	9
I need(ed) my partner very much	1	2	3	9
I feel (felt) trapped and pressured to continue with this relationship	1	2	3	9
We have (had) a good sexual relationship	1	2	3	9

I can (could) talk to my partner about what I want(ed) and need(ed) from our relationship	1	2	3	9
I feel (felt) very attached to my partner	1	2	3	9
We have (had) serious problems and arguments	1	2	3	9
I often get (got) angry and frustrated with my partner	1	2	3	9

SECTION M: LIFE EVENTS

M.1 Since our last interview, have any of the following events occurred to you?

INTERVIEWER: IF "YES" ASK "HOW UPSET OR DISTRESSED WERE YOU BY THIS?"

	No Event	Not Upset	Mildly Upset	Upset	Very Upset
Moved house	1	2	3	4	5
Took out a mortgage	1	2	3	4	5
Built a home or had one built	1	2	3	4	5
Remodelled a home	1	2	3	4	5
Increased financial problems from taking on a mortgage or purchasing a business	1	2	3	4	5
Partner became unemployed	1	2	3	4	5
Partner changed his job or started a new job	1	2	3	4	5
Partner took a cut in wage or salary without a demotion	1	2	3	4	5
Respondent started a new job	1	2	3	4	5
Respondent took a cut in wage or salary without a demotion	1	2	3	4	5

Respondent became unemployed	1	2	3	4	5
Respondent changed her job	1	2	3	4	5
Person moved out of the household	1	2	3	4	5
Someone stayed on in the household after he/she was expected to leave	1	2	3	4	5
Serious family argument other than with spouse	1	2	3	4	5
Family member other than partner or child died	1	2	3	4	5
Close friend died	1	2	3	4	5
Had serious or prolonged disagreements with parents/in-laws	1	2	3	4	5
Serious financial problems	1	2	3	4	5
Suffered a financial loss or loss of property not related to work	1	2	3	4	5
Foreclosure of mortgage or loan	1	2	3	4	5
Became engaged	1	2	3	4	5
Married	1	2	3	4	5
Relations with partner changed for the worse without separation or divorce	1	2	3	4	5
Serious or prolonged arguments with partner/ex-partner	1	2	3	4	5
Divorce	1	2	3	4	5
Separation from partner	1	2	3	4	5
Reconciliation with partner	1	2	3	4	5
Problems with sex (i.e., sexual incompatibility with partner, alleged frigidity, etc)	1	2	3	4	5
Assault by partner	1	2	3	4	5
Assault (other than by partner)	1	2	3	4	5

Robbed	1	2	3	4	5
Respondent involved in court case	1	2	3	4	5
Partner involved in court case	1	2	3	4	5
Serious illness (respondent)	1	2	3	4	5
Injury (respondent)	1	2	3	4	5
Unable to get treatment for an illness or injury (respondent)	1	2	3	4	5
Serious illness or accident of partner	1	2	3	4	5
Serious illness or accident (study child)	1	2	3	4	5
Serious illness or accident of child (other than survey child)	1	2	3	4	5
Serious illness (other family members)	1	2	3	4	5
Became pregnant	1	2	3	4	5
Had a miscarriage	1	2	3	4	5
Had a pregnancy termination (abortion)	1	2	3	4	5
Gave birth	1	2	3	4	5
Pet died	1	2	3	4	5
Broke up with a friend	1	2	3	4	5

Appendix F

Canterbury Child Development
Research Group
Department of Psychology
College of Science

UNIVERSITY OF CANTERBURY
Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

CODE NUMBER

9/ 10 YEAR FOLLOW-UP STUDY
CONSENT FORM

- I have been invited to participate in a study that is comparing the development of children who were and were not born to mothers on methadone maintenance during their pregnancy. I have read and understood the Information sheet dated May, 2013.
- I have had enough time to consider whether I will take part in the study, and to discuss my decision with the researcher or a person of my choice.
- I know who to contact if I have any questions about the study.
- I understand that my participation in this research is **confidential** and that no material which could identify me will be used in any study reports, or made available to anyone else without my approval in writing.
- I also understand that I can withdraw from the study at any time.
- I understand the compensation provisions for the study.
- I am willing for the research team to contact my child's class teacher to obtain information on my child's school progress during the last year. **YES/NO**

I consent to take part in this study.

Parent/s Name: _____

Signature of Parent/s: _____ **Date**: _____

I consent to my child taking part in this study.

Child's name_____ Parent/s Name: _____

Signature of Parent/s: _____ **Date**: _____

In my opinion, consent was given freely and the participant understands what is involved in this study.

Researcher's Name:_____

Signature of Researcher: _____ **Date**: _____

Appendix G

Sources of Stress Scales

There are many things about being a parent that people find stressful or difficult. Can you tell me to what extent the following things are No Problem, Some Problem, or Major Problem for you at this point in your life?

1. Not having enough money for your family's needs

No Problem *Some Problem* *Major Problem* *NA*

2. Not having enough time to yourself

No Problem *Some Problem* *Major Problem* *NA*

3. Not having enough time to spend with your partner

No Problem *Some Problem* *Major Problem* *NA*

4. Transport difficulties

No Problem *Some Problem* *Major Problem* *NA*

5. Inadequate accommodation

No Problem *Some Problem* *Major Problem* *NA*

6. Never having enough sleep

No Problem *Some Problem* *Major Problem* *NA*

7. Not being able to get out of the house

No Problem *Some Problem* *Major Problem* *NA*

8. Never having another adult to talk to

No Problem *Some Problem* *Major Problem* *NA*

9. Not having anyone you could call on for assistance with children

No Problem *Some Problem* *Major Problem* *NA*

10. Anything else (specify below)

Appendix H

Parental Stress Scale

The following statements describe feelings and perceptions about the experience of being a parent. Think of each of the items in terms of how your relationship with your child or children typically is. Please indicate the degree to which you agree or disagree with the following items by placing the appropriate number in the space provided.

1 = Strongly disagree 2 = Disagree 3 = Undecided 4 = Agree 5 = Strongly agree

1. I am happy in my role as a parent.
1 2 3 4 5

2. There is little or nothing I wouldn't do for my child(ren) if it was necessary.
1 2 3 4 5

3. Caring for my child(ren) sometimes takes more time and energy than I have to give.
1 2 3 4 5

4. I sometimes worry whether I am doing enough for my child(ren).
1 2 3 4 5

5. I feel close to my child(ren).
1 2 3 4 5

6. I enjoy spending time with my child(ren).
1 2 3 4 5

7. My child(ren) is an important source of affection for me.
1 2 3 4 5

8. Having child(ren) gives me a more certain and optimistic view for the future.
1 2 3 4 5

9. The major source of stress in my life is my child(ren).
1 2 3 4 5

10. Having child(ren) leaves little time and flexibility in my life.
1 2 3 4 5

11. Having child(ren) has been a financial burden.
1 2 3 4 5

12. It is difficult to balance different responsibilities because of my child(ren).
1 2 3 4 5

13. The behavior of my child(ren) is often embarrassing or stressful to me.
1 2 3 4 5

14. If I had it to do over again, I might decide not to have child(ren).
1 2 3 4 5

15. I feel overwhelmed by the responsibility of being a parent.
1 2 3 4 5

16. Having child(ren) has meant having too few choices and too little control over my life.
1 2 3 4 5

17. I am satisfied as a parent.
1 2 3 4 5

18. I find my child(ren) enjoyable.
1 2 3 4 5